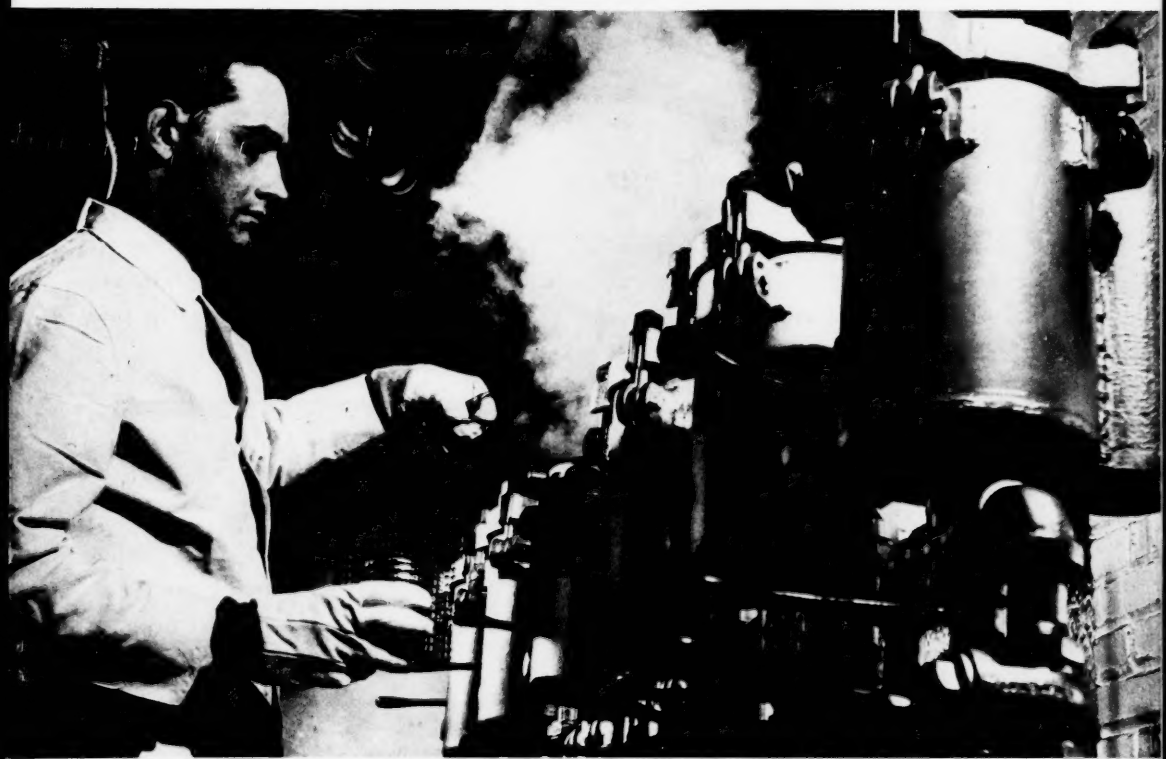
NATIONAL EDITION

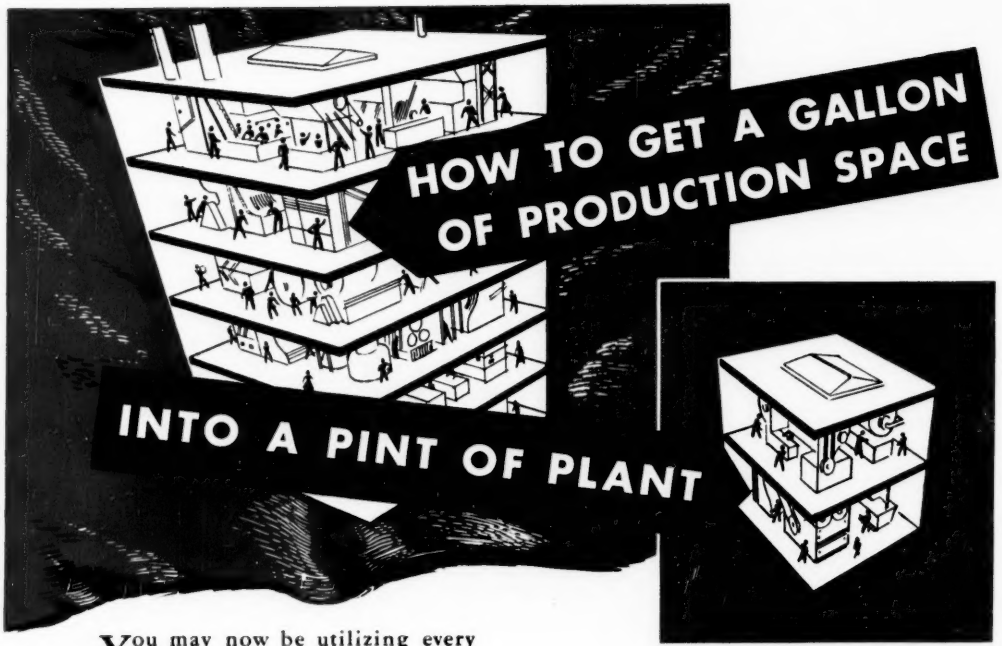
Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



Quality control at Heinz includes "retorting" cassettes of food in laboratory to determine best sterilization process.

APRIL, 1949: Production engineering can help seasonal industry, How colors aid plant operations, Advanced engineering, Quality control, Report

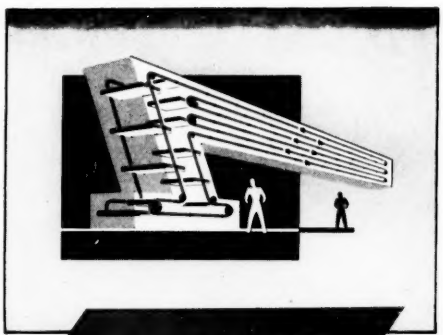


You may now be utilizing every square foot of your production floor. But how about those areas overhead or below floor level? That's where the Greer Multi-Tier can greatly increase your present plant capacity — providing your product calls for controlled cooling, heating, drying, freezing, curing, humidifying, or pasteurizing.

In as little as 10 linear feet of floor space, the Multi-Tier can give you as much processing time as your product requires. At the same time, the Multi-Tier releases the rest of your floor space for increased production.

Your product is placed on a Multi-Tier tray either loose, in racks, containers, or molds. The tray moves at a speed determined by your rate of production — is always stable and always perfectly level.

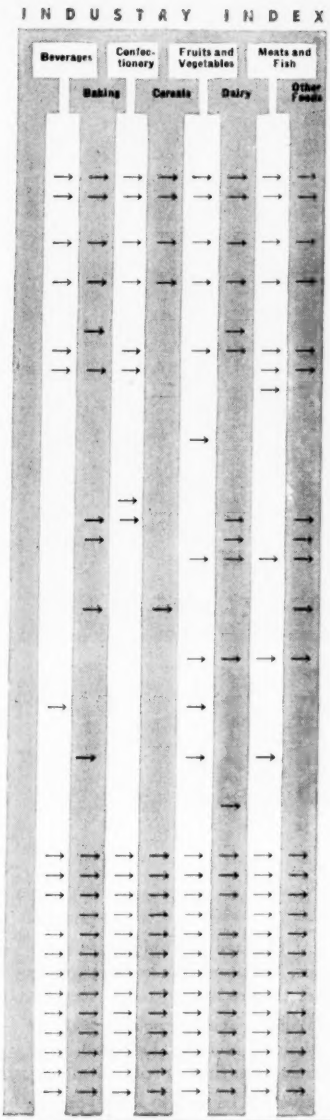
Write today outlining your problem and we will show you how the Greer Multi-Tier can increase production and save space in your present plant.



GREER
MULTI-TIER

J. W. GREER COMPANY
125 WINDSOR ST., CAMBRIDGE 39, MASS.

Manufacturers of *Continuous* Production Machinery



Food Industries

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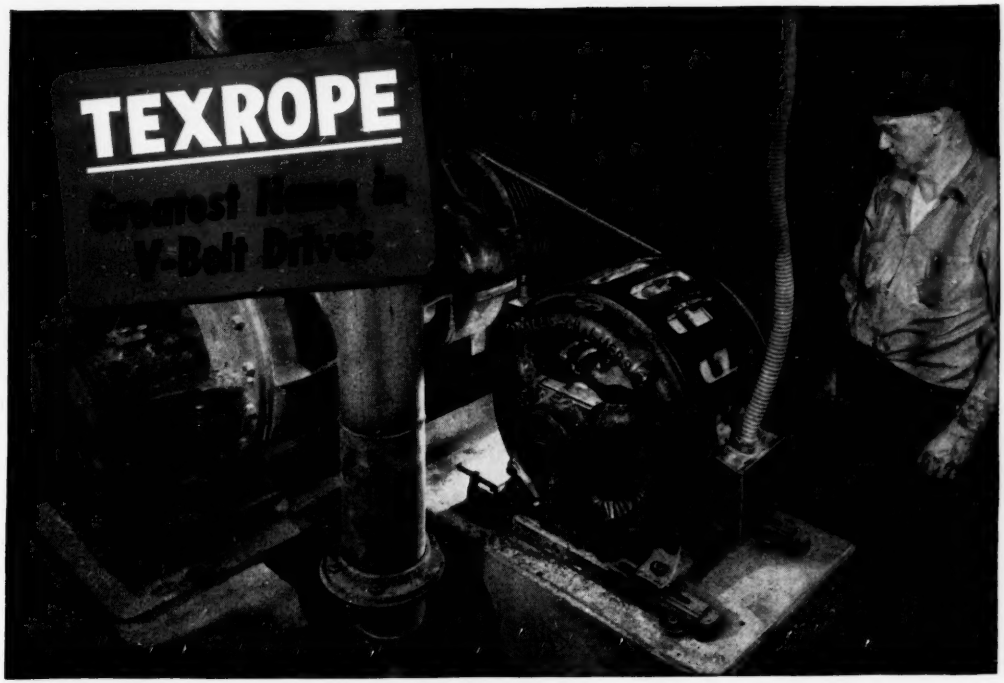

"No Upkeep Now"

BELT SLIP ELIMINATED, BEARING DAMAGE STOPPED, POWER WASTE ENDED WHEN *TEXROPE* V-BELT DRIVE REPLACES FLAT BELT.

THAT'S REPORT of W. Pfeil, Chief Engineer of the Best Brewery, Chicago, makers of Embassy Club beer. "This blower sucks grain into our storage bins. The old flat belt was twelve inches wide on twenty foot centers. It was heavy and absorbed a lot of power. Grain dust made the belt slip constantly. We had to keep it so tight that it ruined bearings or slipping would burn the belt. Maintenance cost us hundreds of dollars a year.

"Four years ago an Allis-Chalmers representative recommended this *Texrope* drive. It doesn't slip at all, doesn't hurt the bearings and we haven't spent a cent on it. I wish we had changed to a *Texrope* drive years sooner."

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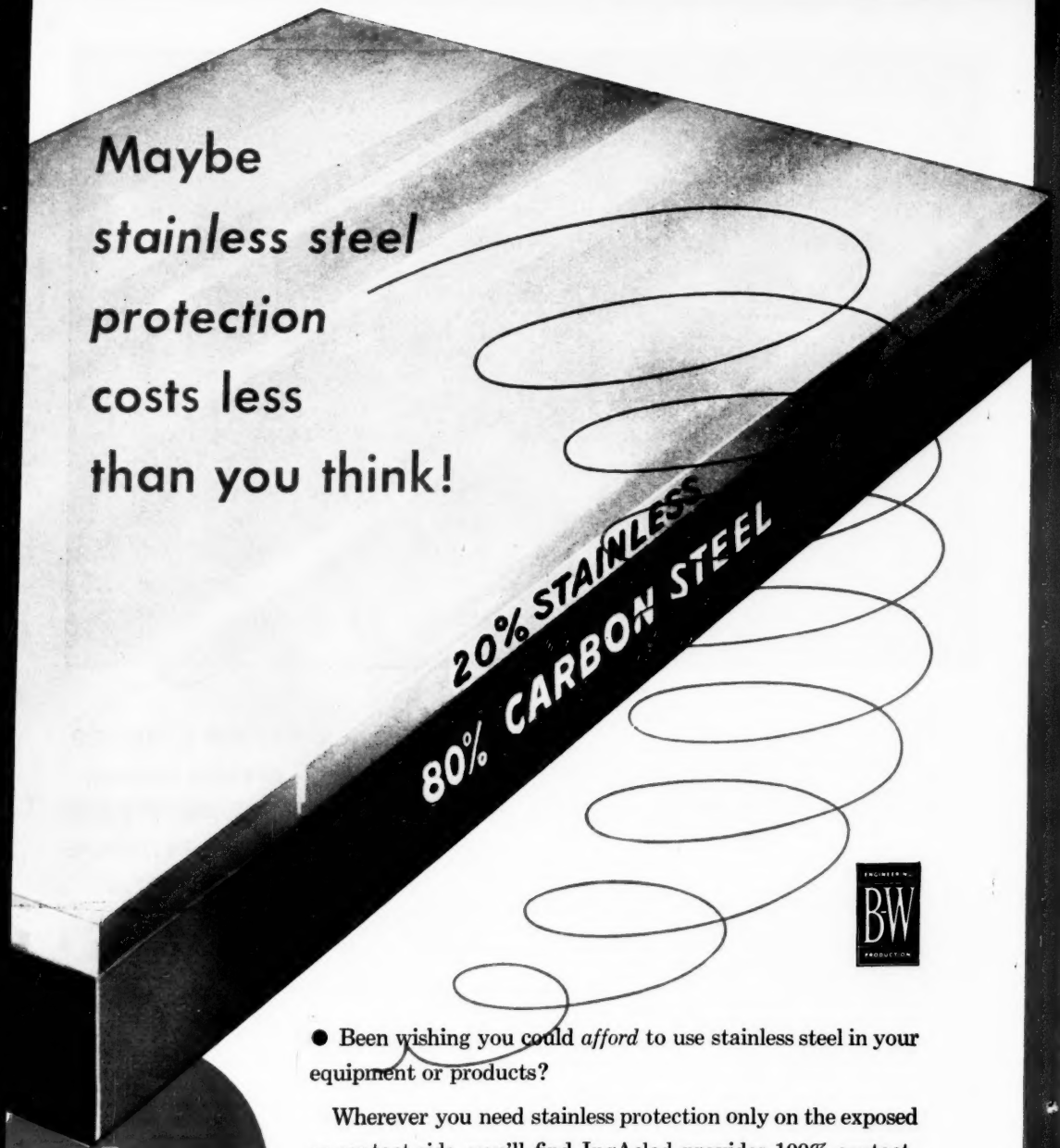

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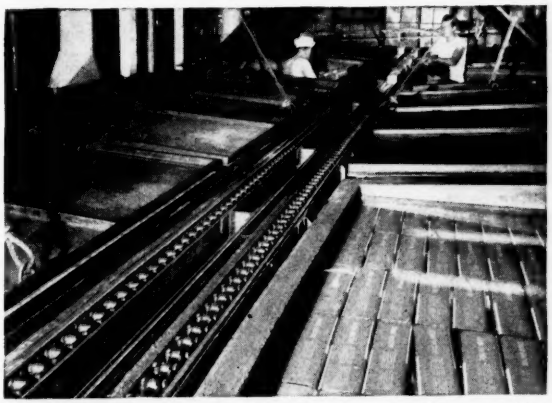
LINK-BELT

Conveyors *cut costs and speed production*

Sealed cans are forwarded from the vacuum sealing machine to cooker by means of this flexible Link-Belt conveyor.

Link-Belt equipment delivers cans to wiping table; in the center, a Link-Belt worm gear speed reducer and roller chain, drive the inclined conveyor. Note carton conveyor at upper right.



Link-Belt chain conveyor on the right brings canned meat to cooking vats, and the one on the left transports product to shipping room.

A perplexing problem of increasing production was economically solved by the installation of a Link-Belt conveying system in the meat canning department of an Iowa meat packing plant.

Today, time is saved because Link-Belt swivel chain conveyors move cans between operations on a horizontal plane at an uninterrupted pace. Occasional production lags are eliminated since manual trucking is no longer needed. The extra operation of handling baskets has also been discarded. Overhead and out of way, another Link-Belt conveyor moves cartons—prevents damage—also replaces time-consuming hand-trucking.

This is but one of many typical Link-Belt installations in the food industries. Whatever your conveying, screening, drying or power transmission problems — call on Link-Belt. There's an office near you.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities. 11,419

Link-Belt products include Overhead Pusher Conveyors . . . Chains & Sprockets of all types . . . Boning and Hog Cutting Conveyors, as well as Conveyors and Elevators of the Apron, Belt, Bucket, Chain, Flight, Bulk-Flo, Interno, Oscillating, Trolley and Screw types for handling edible and inedible products . . . Coal and Ashes Handling Equipment . . . Vibrating, Liquid, Revolving, Sewage and Water-Intake Screens . . . Car Spotters—Portable and Stationary types . . . Portable Car Iciers . . . Ice Crushers and Slingers . . . Spray Nozzles . . . Babbitted, Ball and Roller Bearings . . . Speed Reducers and Increasers . . . Gearmotors . . . Fluid Drives . . . Variable Drives . . . Silent Chain Drives . . . Roller Chain Drives . . . Hangers . . . Collars . . . Clutches . . . Couplings . . . Gears . . . Pulleys . . . Base Plates . . . Shafting . . . etc.

LINK-BELT

THE SYMBOL OF QUALITY — LINK-BELT

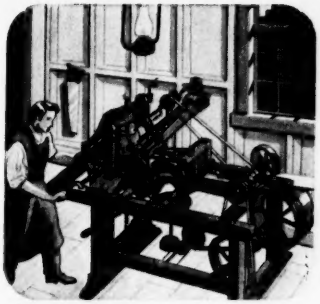
CONVEYORS

HANDLING EQUIPMENT . . . POWER TRANSMISSION MACHINERY

Artist – Cecil West, native of Tennessee

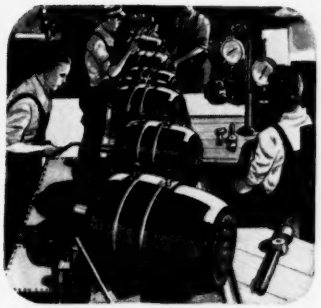
TENNESSEE—*annual purchases: $1¾ billion—mostly packaged.*

CONTAINER CORPORATION OF AMERICA



1 1865—Here's how machines looked before man applied electricity for industrial usage. Gear setups were crude. Making parts fit was a matter of luck and plenty of tinkering by operators.

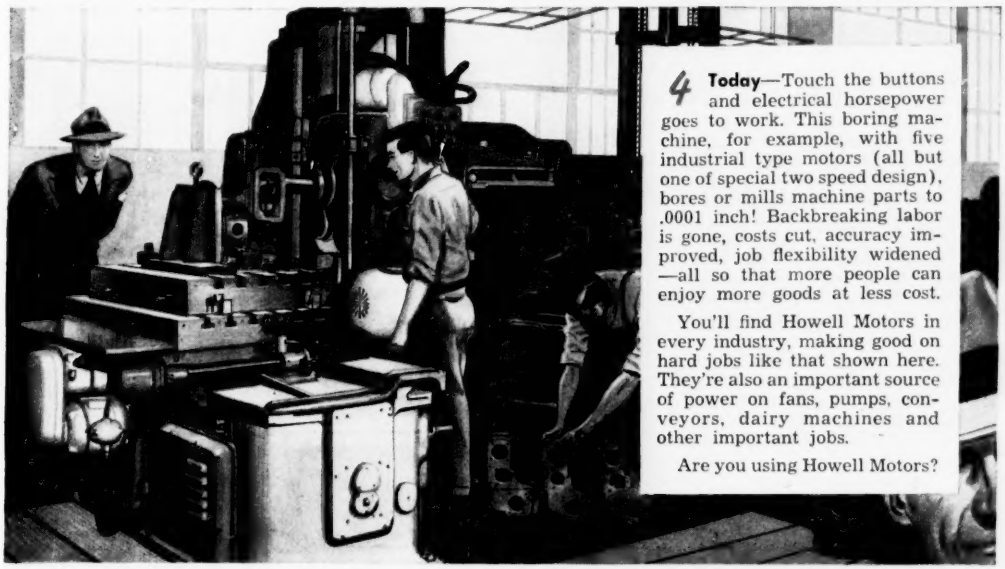
2 1907—Electrical horsepower gave production a big boost. But gear mechanisms were far too cumbersome. Repairs were frequent. Men were still struggling to make one motor do the work of many . . .



3 1915—Howell "Red Band" Electric Motors arrived. These rugged, industrial type motors were specially designed to withstand hard usage. Soon, Howell Motors appeared in this and other industries.

NOW, IT'S TOUCH AND GO!

(and parts are machined quicker and to closer tolerances)



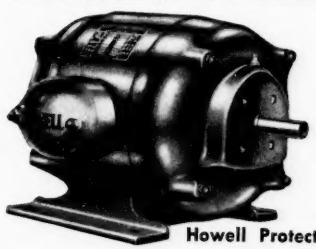
4 Today—Touch the buttons and electrical horsepower goes to work. This boring machine, for example, with five industrial type motors (all but one of special two speed design), bores or mills machine parts to .0001 inch! Backbreaking labor is gone, costs cut, accuracy improved, job flexibility widened—all so that more people can enjoy more goods at less cost.

You'll find Howell Motors in every industry, making good on hard jobs like that shown here. They're also an important source of power on fans, pumps, conveyors, dairy machines and other important jobs.

Are you using Howell Motors?

Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.

Here's another precision-built Howell Motor . . . industrial type with copper or bronze bar rotors . . . specially insulated . . . statically and dynamically balanced.



Howell Protected Type Motor

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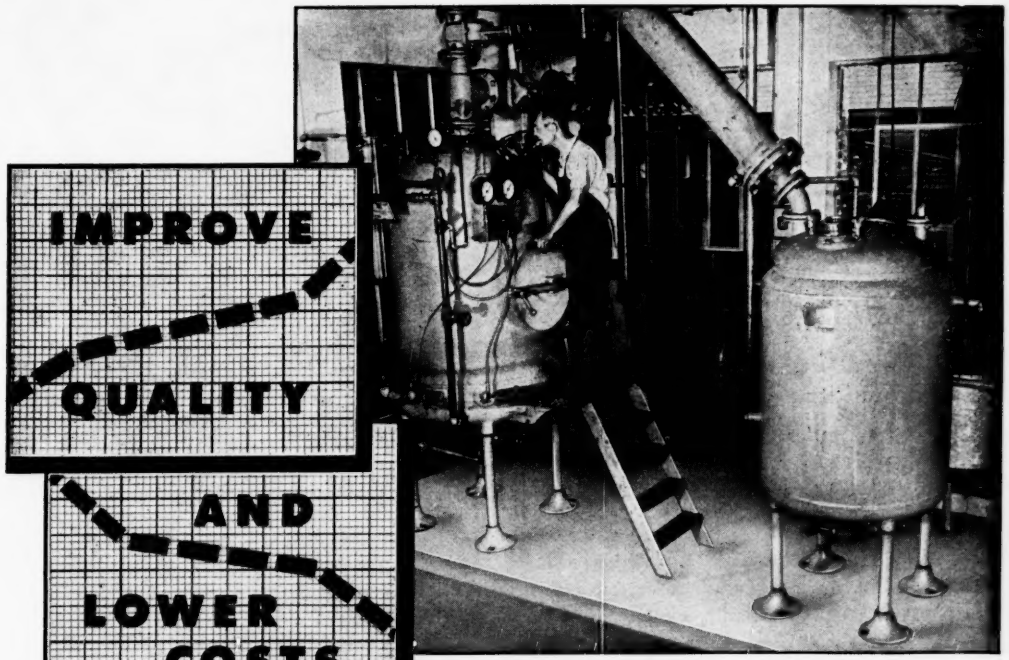

Pfaudler vacuum distillation assembly for making fruit concentrates at Limpert Bros., Inc., Vineland, N. J.

by accurately controlling the process!

Accurate control of the process is the key to better food products at lower cost. Here is a typical example—a vacuum distillation process for making fruit concentrates at Limpert Bros., Inc., Vineland, N. J.

Water is quickly removed by means of low temperature, high speed evaporation. Products are uniform in quality, heavy in body, natural in color and flavor. They retain all important natural characteristics. They sell better.

By saving time, by eliminating product losses through carmelization, off flavor, or loss of color, costs have been reduced.

Pfaudler engineers can help *you* obtain better products at lower costs by designing and building equipment that gives you accurate control throughout the process. That's the trend in food engineering. Are you prepared? Write today!

Pfaudler

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THIRTEEN BAKERIES, COAST-TO-COAST

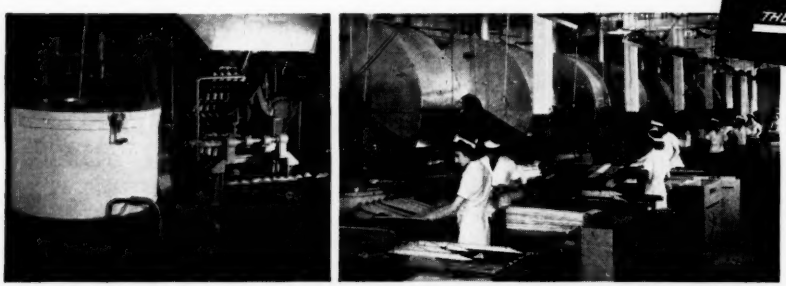
Demonstrate Controllability of GAS

UNIFORM TEMPERATURE of the baking molds is an essential feature of the continuous cup and cone machine. Fed automatically, one of these machines will release 5,000 cones or cups per hour when the molds are maintained at even temperatures up to 600°.

In coast-to-coast operations the makers of FLARE-TOP Cake Cones and EAT-IT-ALL Cake Cups for ice cream service use approximately one hundred baking machines. To maintain precise mold temperature these machines are heated by GAS, the ideal fuel for food processing.

One bakery, Keystone Cone Company of Pittsburgh, has a capacity of 225 million cones and cups per year. In describing these volume operations, General Manager J. E. Abbey emphasized the fact that GAS, in addition to its accurate controllability, was important in heat processing of foods because of its cleanliness, speed, and economy.

These characteristics of GAS, so essential in the manufacture of Flavor-ized Cake Cones and Cups, are just as important in other food industry applications such as roasting, baking, toasting, smoke-curing, dehydrating. In thousands of food manufacturing plants the productive flames of GAS are helping to establish new records for productioneering. It's always worthwhile to keep an eye on developments in modern Gas Equipment for heat processing.



Typical view of cone bakery with close-up of one of the continuous machines in which GAS maintains the baking molds at even temperatures up to 600°.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE **NEW YORK 17, N. Y.**

the horsesense way to use horsepower

There is one best way to secure the slower speeds you need for most of your motor driven machinery . . . use Master Gearmotors . . . the horsesense way to apply horsepower.

Follow the example of the designer of this materials testing machine. See how he has used this Master Gearmotor to secure power right where he needs it . . . and at exactly the right speed. How else could he have achieved such a compact, clean-cut, economical design.

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THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

Announcement by Colton

THE goodwill, patents, inventory and certain assets of the Arthur Colton Company have been purchased by Snyder Tool & Engineering Company of Detroit which will operate the Colton Company as a subsidiary under the Colton name.

Operation will be transferred to the large, new Snyder plant where there is every modern facility for building fine machines for many fields of manufacturing and packaging.

Administration will be in the hands of an executive combination merging the specialized experience of the engineering, sales and manufacturing departments of the 65-year-old Colton Company with that of the 25-year-old Snyder Company in order to provide a service of outstanding worth to Colton clients throughout the world.

ARTHUR COLTON COMPANY

DETROIT, MICHIGAN

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Hose made by Republic is famous for quality. Republic employees jealously protect this reputation.

Service Requirements—Not Price Determine Republic Hose Quality

Tower Pneumatic Hose

Tower Pneumatic Hose, largest seller in the Republic line, has tough brown cover, oil resistant tube, and is extremely flexible. Sizes 3/8" to 1-1/2"—two and three braid.

• You will be wise to consult an experienced salesman when you are buying hose, since the many types of available hose are manufactured in different grades. For practically every need, Republic Rubber Division makes a construction of hose designed for the specific application. Experience has not only taught us how to build each type and grade, but experience has also proved which hose delivers the best results under given conditions.

Republic Hose is sold exclusively by distributors of industrial supplies. Through years of experience, these distributors have gained the knowledge to recommend hose which will serve your requirements with greatest satisfaction. Write or mail the coupon for the name of the Republic Distributor in your area.

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Republic Rubber Division sells its conveyor belting, transmission belting and hose exclusively through distributors of industrial supplies, and Republic believes it can serve you best through these experienced distributors. Write or send the coupon for the name of the Republic Distributor in your area.

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Youngstown, Ohio

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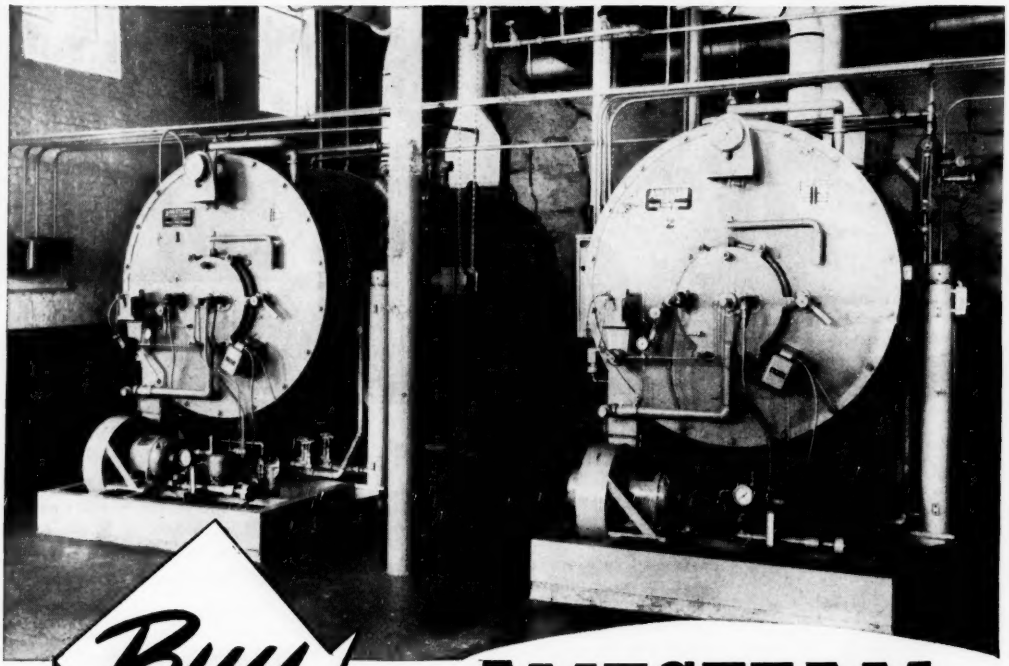
City_____ State_____

WHAT'S YOUR STEAM PROBLEM?



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AMESTEAM GENERATOR

Do you want — a dependable, quick steaming unit? Minimum installation expense? Economical operation?

- **AUTOMATIC OPERATION**—from a cold boiler to full operating pressure in only a few minutes — just press the button.
- **ECONOMICAL OPERATION**—guaranteed 80% efficiency. Fuel consumed only as steam is used. Combination Units available for quick change-over to either oil or gas to meet changing fuel availability.
- **ACCESSIBILITY**—rear flue cover and baffle easily removed for cleaning and inspection. All equipment installed in easy-to-get-at locations.

STANDARD EQUIPMENT INCLUDES: In addition to the minimum equipment usually furnished with Units of this type, our standard unit for over 15# design steam pressure regularly includes:

Condensate Tank	**Blow-off Valve**
Feed Pump Unit	**Injector**
Main Steam Valve	**Necessary Refractories**

Insulation and Metal Jacket

Remember these are not extras to be added to our bid—they are standard equipment.

With your AMESTEAM Generator, you get everything you need except fuel tank, piping to boiler, wiring from power lines to boiler, and a breeching or vent pipe.

AMES IRON WORKS Oswego, N.Y.
Builder of Better Boilers Since 1848

Write **for the AMESTEAM Generator Bulletin A-304**

NO NEW WORLDS TO CONQUER

?

OF IMPORTANCE TO FOOD AND FRUIT PRODUCTS INDUSTRIES

SODIUM BENZOATE U.S.P. A standard preservative of food quality, flavor and color. Available as powder, granules or flakes. Shipped in 100 lb. bbls; 50 and 25 lb. fiber drums.

BENZOIC ACID U.S.P. Widely used as a preserving agent. Shipped in 100 lb. bbls, 50 and 25 lb. fiber drums.

BENZALDEHYDE N.F. Synthetic oil of bitter almonds. For flavoring and aroma in canned fruits, fruit beverages, cake mixes, candies. Shipped in 425 lb. drums, 100 lb. carboys, and 50 and 25 lb. boxed tins.

METHYL SALICYLATE U.S.P. Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. boxed tins.

SACCHARIN U.S.P. SACCHARIN SODIUM U.S.P. Standard sweetening agents. Saccharin (powder) is more soluble in oils and solvents, while Saccharin Sodium (powder or granular) has a higher solubility in water. Shipped in 100, 50 and 25 lb. fiber drums, 5 lb., 1 lb., 4 oz. and 1 oz. canisters.

2270 years ago, Alexander the Great had conquered the entire civilized world. At the age of 32—as master of the earth—Alexander wept, for there were no more worlds to conquer . . .

So the story goes—but a far more dramatic one has been written by chemistry and its "conquerors", for there are always new worlds to win in the conquest of matter and methods—in the elimination of disease and famine, waste and want. Research recognizes no limitations, with newer and finer chemicals constantly at hand to point the way.

Heyden has always geared its facilities and creative skill to industry and science, offering the maximum in quality, purity and perfection in chemicals. Today, there are very few process industries—from drugs to dyes, perfumes to plastics, rubber to resins, leather to lubricants—which do not use Heyden's finer chemicals—to put the PLUS in their process!

Technical Literature, shipping details and prices upon request on Company letterhead.

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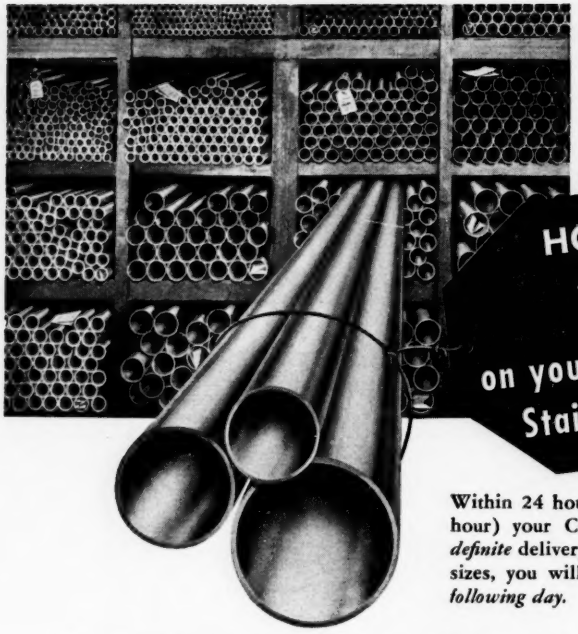
HEYDEN CHEMICAL CORPORATION

FINE HEYDEN CHEMICALS

Serving Industry Through Finer Chemicals

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

CHICAGO 6: 20 North Wacker Drive • PHILADELPHIA 3: 1700 Walnut Street • SAN FRANCISCO 11: 420 Market Street



HOW IS THIS FOR *Fast Service* on your orders for *Carpenter* Stainless Tubing and Pipe?

Within 24 hours after you call (very often within 1 hour) your Carpenter Distributor will give you a *definite* delivery promise for your order. On standard sizes, you will often get *delivery of your order the following day.*

- **ATLANTA, GEORGIA**
  J. M. Tull Metal & Supply Co., Inc.
- **BALTIMORE, MARYLAND**
  Horace T. Potts Co.
- **BOSTON, MASSACHUSETTS**
  Brown-Wales Company
- **BUFFALO, NEW YORK**
  Service Steel Company
- **CHARLESTON, WEST VIRGINIA**
  The McJunkin Supply Company, Inc.
- **CHICAGO, ILLINOIS**
  C. A. Roberts Co.
- **CINCINNATI, OHIO**
  Service Steel Company
- **CLEVELAND, OHIO**
  The Cleveland Tool & Supply Co.
- **DETROIT, MICHIGAN**
  Service Steel Company
- **ELIZABETH, NEW JERSEY**
  Schnitzer Alloy Products Company
- **HILLSIDE, N. J.**
  Edgcomb Steel Corp.
- **HOUSTON, TEXAS**
  Electric Steel Foundry Company
  Standard Brass & Mfg. Company
- **INDIANAPOLIS, INDIANA**
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  Slip-Not Belting Corp.
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  C. A. Roberts Co.
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  Electric Steel Foundry Company
- **SEATTLE, WASHINGTON**
  Electric Steel Foundry Company
- **TULSA, OKLAHOMA**
  C. A. Roberts Co.

BRANCH OFFICES:
THE CARPENTER STEEL COMPANY
Alloy Tube Division

- **ATLANTA, GEORGIA**
  800 Peachtree St., N. E.
  Telephone: Atwood 3778
- **CHICAGO, ILLINOIS**
  221 North LaSalle Street
  Telephone: Central 6-3506
- **HOUSTON, TEXAS**
  3220 Louisiana Street
  Telephone: Jackson 2-3929
- **ST. LOUIS, MISSOURI**
  712 Cass Avenue
  Telephone: Chestnut 3452
- **SAN FRANCISCO, CALIFORNIA**
  24 California Street
  Telephone: Yukon 6-4266

One Call Does It All!

When you call your Carpenter Stainless Tubing Distributor, you don't have to follow-up your inquiry. You can be sure of prompt service and fast delivery of your order.

THE CARPENTER STEEL COMPANY • ***Alloy Tube Division***
109 Springfield Road **Union, New Jersey**

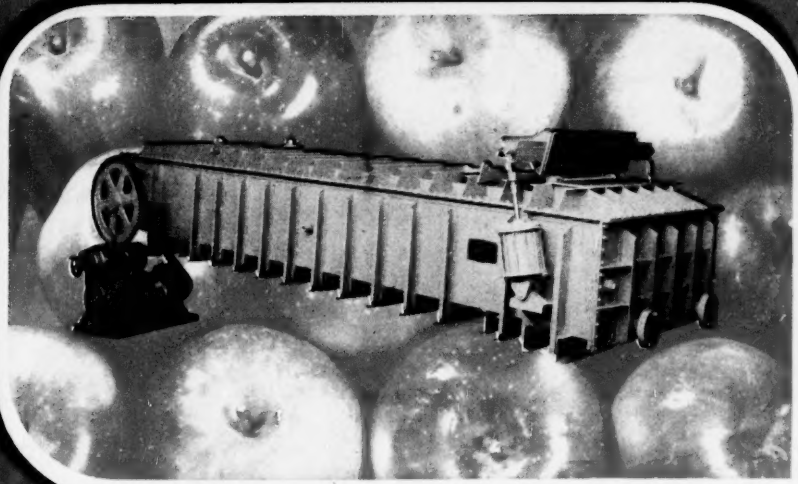
Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

ASK STOKES

A Bridge-section? No! It's an Apple-cooker!



THE problem as it came to us was to blanch and pre-cook apples at less cost per apple . . . without discoloration or loss of flavor. The equipment pictured is our answer to the problem; several are now in use after the success of the first.

Loading, vacuum, steam, and cooking constitute a 3½-minute cycle. Unloading and reloading are simultaneous. Capacity per 8-hour day: 2500 bushels of slices for making apple pie. And everything is controlled by push-buttons!

Penicillin was first commercially dried by Stokes, too . . . in the Stokes laboratory. It seems a wide spread from penicillin to pies but to Stokes it's just another process.

We are experienced and expert at developing processes and methods of manufacture. Then we design the equipment and tell you what it will cost to buy and run it.

Got any problems?
F. J. Stokes Machine Company,
5976 Tabor Rd., Phila. 20, Pa.

FJS

Stokes makes Vacuum and Special Processing equipment, High Vacuum Pumps and Gages, Pharmaceutical equipment, Industrial Tabletting and Powder Metal Presses, Plastics Molding Presses, Water Stills and Special Machinery.

STOKES KNOWS HOW

"Me . . . stock all those endless V-Belt sizes?"

"Not since I use VEELOS"

"I can replace any V-belt in our plant with just these reels of Veelos."

That's a typical Veelos user telling you how Veelos cuts V-belt inventory. If you use O, A, B and C widths, four reels of Veelos give you a choice of more than 316 sizes. Use only A and B? Then two reels are all you need.

Buying matched sets of endless V-belts is costly. Forget it with Veelos. Forget, too, belt deterioration and obsolescence. Veelos on reels saves storage space . . . simplifies stock records.

Veelos is quickly and easily installed. On drives with fixed centers or outboard bearings, Veelos is installed without moving the motor or dismantling the machine. It provides substantial savings in installation and maintenance costs.

VEELOS
THE LINK
V-BELT

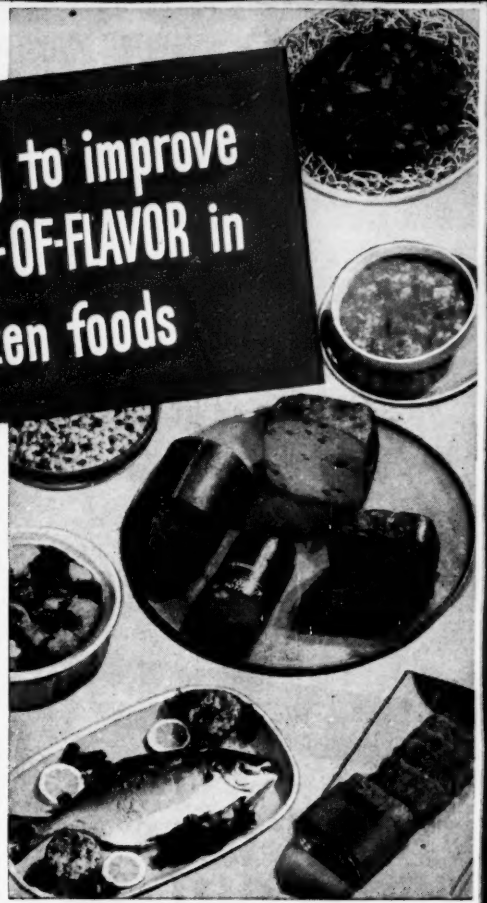
SEND FOR FREE VEELOS CATALOG. It shows how you can benefit from the many important advantages of Veelos. Fully illustrated. Complete engineering data. Write for it.

MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PA.

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all standard sizes, fits all standard grooves. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 300 distributors throughout the country. Veelos is known as VEELINK outside the United States.

Easy low-cost way to improve and preserve PEAK-OF-FLAVOR in cooked or frozen foods



NOW, at an amazing low cost, you can win increased praise and public preference for your products by the simple addition of Staley's GLUTAMATE (99+% pure monosodium glutamate). This remarkable food ingredient is now regularly used by processors of soups, chowders, meats, and vegetables. Its results are dependably uniform whether foods are frozen, dehydrated or canned.

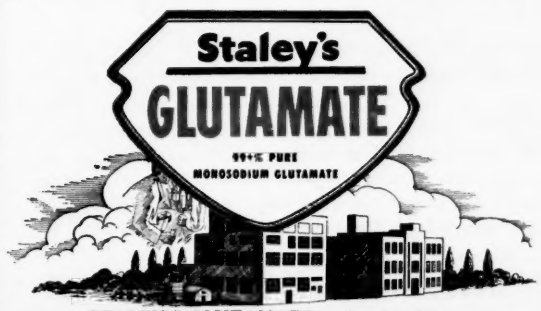
Do not confuse Staley's GLUTAMATE with flavoring agents, spices, normally used seasoning materials, or costly *blends* containing small amounts of monosodium glutamate. Staley's GLUTAMATE is a 99+% pure product. It does not flavor foods, it intensifies and maintains the natural food flavors even when foods are subjected to high cooking and canning temperatures.

As easy to use as salt
No basic formula changes necessary

Staley's GLUTAMATE is a free-flowing granular material resembling coarse table salt or fine granulated sugar in appearance. Individual crystals are transparent and colorless. A 5% water solution has a pH value of 6.8. A very small amount is required for maximum effectiveness. Range for most products is from 0.05% to 0.5% of the weight of the food.

Try Staley's GLUTAMATE (99+% pure monosodium glutamate). Descriptive literature and the services of our technical staff are yours for the asking. Write today.

A. E. STALEY MANUFACTURING CO., DECATUR, ILL.



STALEY'S GLUTAMATE produced under exacting laboratory control in new $2,500,000 plant.

For finer flavor
Try Staley's GLUTAMATE in

Canned Soups • Dried Mixes
Poultry • Meat and Sea Food • Vegetables
Seasonings • Sauces • Dressing

A. E. Staley Manufacturing Co., Box 1091
Industrial Sales Department
Dept. FI4, Decatur, Ill.

☐ Please send us one pound trial order of Staley's Glutamate at your special introductory price of $1.56 (postage prepaid).

☐ Check enclosed. ☐ Invoice us.

☐ Please send us more information on Staley's Glutamate.

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City and State*_____

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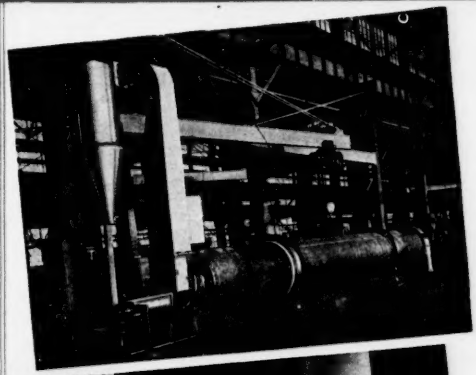
3 out of 4 buy Riegel

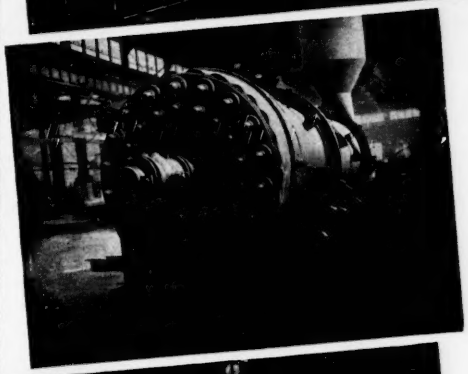
Three of the four largest prepared dessert makers buy Riegel Papers regularly

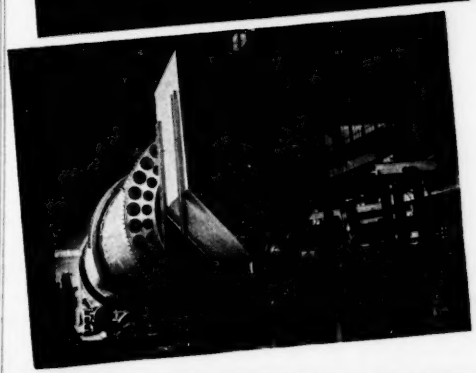
Among the producers of prepared desserts, and in many other fields, you will find most of the sales leaders are regular Riegel customers. They buy from us because they know we can make packaging and industrial papers that combine technical excellence with economy and production efficiency. Their confidence in Riegel is an important reason why your company—whether large or small—should see if we can also help you. Write to Riegel Paper Corporation, 342 Madison Avenue, New York 17, N. Y.

Riegel Papers **We produce over 600 different packaging, printing, converting and industrial papers. If we don't have what you want, we can probably make it.**

PROFITS FROM DRYERS DON'T "JUST HAPPEN"!







Louisville Dryers have the built-in experience of 56 years devoted to solving drying problems.

This experience covers different industries, many products and various types of dryers such as Rotary Steam Tube, Indirect Steam, Direct Heat, Type "L" (Semi-Indirect Heat), Drum Dryers, Roller Presses, Dewaterers, Coolers, etc.

Sound engineering and design are translated into finished equipment through extensive manufacturing facilities and construction experience. Louisville Dryers are built in modern shops equipped for the fabrication of custom-made unit process equipment from all weldable alloys and steels.

If you have a drying problem, or are contemplating modernization of your present facilities, call upon General American.

OTHER GENERAL AMERICAN EQUIPMENT

Drum Dryers	Thickeners	Roller Presses
Rotary Dryers	Filters	Screw Presses

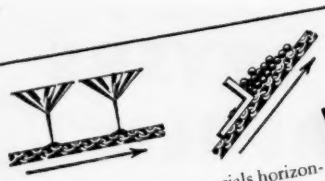
Turbo-Mixers • Evaporators
Turbo-Hydrogenators • Thickening Screens
Citrus Process • Malek Rice Process

GENERAL AMERICAN TRANSPORTATION CORPORATION

Process Equipment Division
(LOUISVILLE DRYING MACHINERY UNIT)
1004 Hoffman Bldg., Dept. 840, Louisville 2, Ky.
WORKS: Sharon, Pa., East Chicago, Ind.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

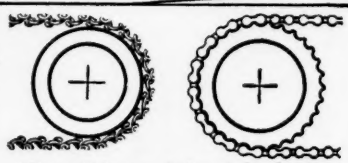
OFFICES: Chicago, New York, Cleveland, Orlando, Pittsburgh, St. Louis, Salt Lake City, Sharon, Washington, D. C.



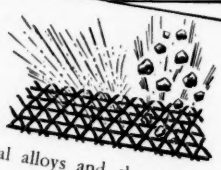
Wissco Belts convey materials horizontally or on an incline by use of Wissco Angle Flexlift or Fabric Flexlift.

Wissco Belts are built to operate efficiently at temperatures as low as –40°F. or to withstand temperatures as high as 2100°F.

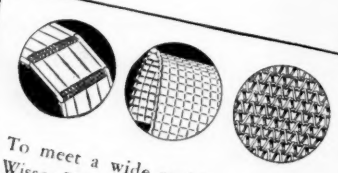
Whether your product is light or heavy, large or small, Wickwire can custom-engineer a belt to carry it safely and efficiently.



Wissco Belts are designed for friction drive installations or combined with several types of chain edge constructions for use on positive drive equipment.



Special alloys and chemical resistant metals are used in making Wissco Belts that must withstand corrosion, abrasion and other destructive forces.



To meet a wide variety of needs, Wissco Belts are available in a number of woven wire constructions and in plate and channel type constructions.

WISSCO BELTS' ADAPTABILITY

ANSWERS INNUMERABLE PROCESSING PROBLEMS

FIFTY YEARS of pioneering in belt development and design have provided the know-how for solving difficult problems—for custom-engineering Wissco Belts with the stamina and built-in toughness that insure new highs in production, new lows in cost. Why not avail yourself of the services of our belt engineers. There is no obligation—and it may provide the cost-cutting answer to rising production costs.

Let us send you our illustrated catalog showing types and advantages of numerous conveyor belt constructions. Write to our nearest office.

WISSCO METAL CONVEYOR BELTS

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

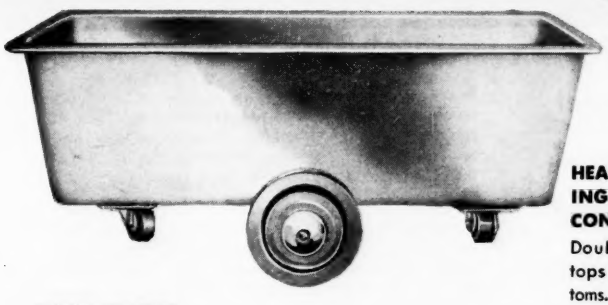
CF&I

Belt Sales Office and Plant—56 Sterling St., Clinton, Mass. • *Executive Office*—500 Fifth Avenue, New York 18, N. Y.

Sales Offices—Boston, Buffalo, Chattanooga, Chicago, Denver, New York • *Pacific Coast Subsidiary*—The California Wire Cloth Corp., Oakland 6, Cal.

Employees like this easy-to-handle aluminum equipment

Light-in-weight Wear-Ever aluminum equipment brings cheers from the men who work with it, for it means less fatigue. It brings cheers, too, from those responsible for efficiency and *operating* costs. For the super-tough alloy from which Wear-Ever aluminum food equipment is made resists gouging and denting—gives many extra years of hard service. Mail the coupon below for full information on Wear-Ever Aluminum food plant equipment. The Aluminum Cooking Utensil Co., Wear-Ever Bldg., New Kensington, Pa.



FOOD TRUCKS

Strong aluminum body. 14 cu. ft. capacity. Continuous welds eliminate cracks and crevices. St. John Neotread wheels.

HEAVY DUTY INGREDIENT CONTAINERS

Double-thick tops and bottoms. Beveled edges. 15 sizes from 8 to 200 qts.

WEAR-EVER Aluminum

...the metal that is friendly to foods

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

The Aluminum Cooking Utensil Co.
304 Wear-Ever Bldg., New Kensington, Pa.

Please send me further information about your

☐ Tubs ☐ Pails ☐ Food Trucks
☐ Ingredient Containers ☐ Complete Line

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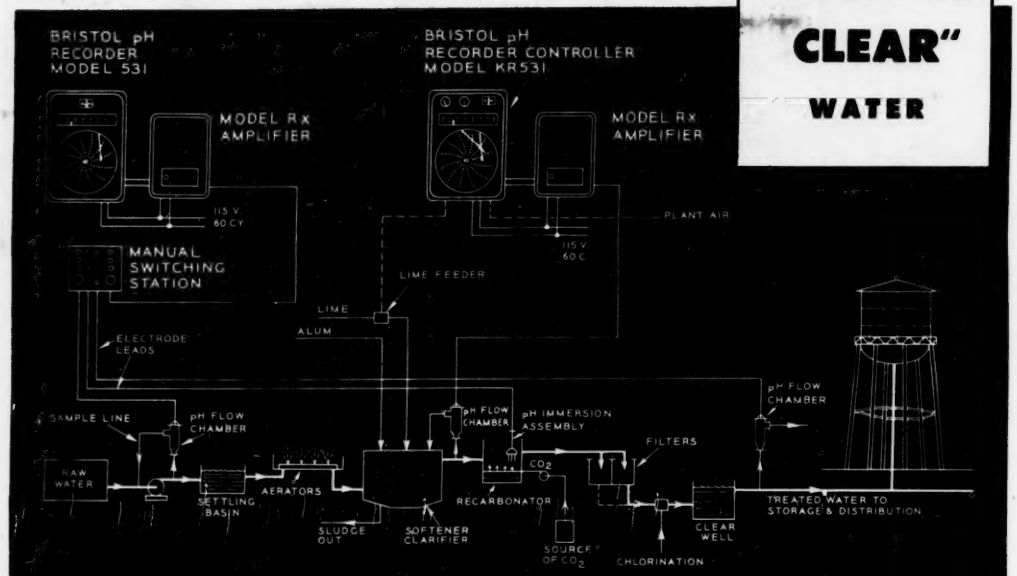
Wash Down Your Processing Costs

WITH "BRISTOL CLEAR" WATER



BRISTOL RECORDING AND AUTOMATIC CONTROLLING INSTRUMENTS FOR INDUSTRIAL WATER TREATMENT

Controlling Water Treatment with Instruments Improves Each Process Using Water —Lowers Purification Costs

When Bristol recording and control instruments take over the problem of preparing water for use in cooling, washing, blanching, mixing, scalding and other purposes, processing efficiency goes up, water purification cost goes down, food quality goes up.

Automatic control of water treatment provides a supply of water of the correct pH value, regardless of varying raw water conditions. And it makes the water "Bristol-Clear" at much less expense than without the automatic control feature.

As the diagram shows, Bristol pH instruments keep an eye on raw water and apply the exact amount of treatment needed for uniform purity. The complete installation of recorders and controllers pays for itself in savings made in process work and in reducing supervision of water treatment.

Write for Bulletin pH1302 on Bristol Continuous pH Recorders and Controllers and investigate Bristol instruments, too, for recording and automatically controlling temperatures, flow, liquid level and pressure. THE BRISTOL COMPANY, 115, Waterbury 91, Conn. (The Bristol Co. of Canada, Ltd., Toronto, Ont. Bristol's Instrument Co., Ltd., Lynch Lane, Weymouth, Dorset, England.)

60 YEARS...1889-1949

BRISTOL

Engineers Process Control for Better Products and Profits

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

One of two Eriez Permanent Magnetic Drums at the Kellogg Company, Battle Creek, Michigan used to remove both fine and larger pieces of ferrous metal. Note how Drum has been installed in conjuncton with two conveyors. One above unit—one below.

KELLOGGS don't put up with metal contamination

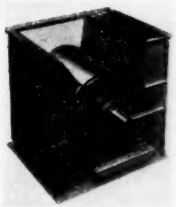
They put *Eriez* on the job.

THE new Eriez Non-Electric Permanent Magnetic Drum pictured here was just the answer for removing tramp iron in processing 30% moist bran at Kelloggs', Battle Creek, Michigan. Placed at the discharge end of their screw conveying lines, Eriez Drums efficiently handle large volumes of bran and provide automatic removal of ferrous metal. There's no chance of contamination in Kellogg products because Eriez Protection has really been put to work. Throughout their modern well equipped plant, all types of Eriez units are assuring necessary protection. For instance, Eriez Permanent Magnetic Pulleys for belt conveyors, Eriez Magnetic Drums, and a score of Eriez Plate Magnets in gravity flow chutes. Eriez protection pays big dividends . . . low installation cost . . . no operating costs . . . elimination of machinery damage . . . prevention of production stoppage.

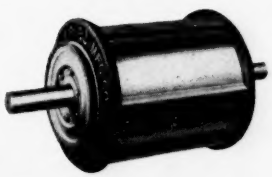
A new 4 page bulletin describing Eriez Magnets for food applications is now available. Write for your FREE copy today.

Eriez drums are available in these models .....

DF-101—Furnished complete with housing and feeder attachment. Completely self-cleaning and dust tight.



DF-102—Compact cubicle housing for minimum space requirements. Self-cleaning and dust tight.



Magnetic Drum without housing but complete with shaft and sheave.

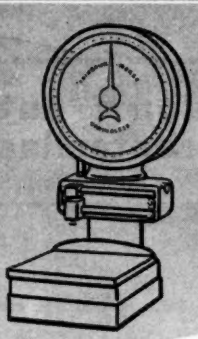
Pioneer of **PERMANENT** Magnetic Separation

SEE OUR CATALOG IN SWEET'S

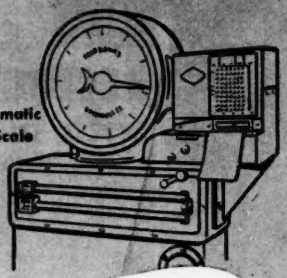
See our catalog P $\frac{1b}{2}$ Sweet's Processing Industries File

ERIEZ MANUFACTURING COMPANY

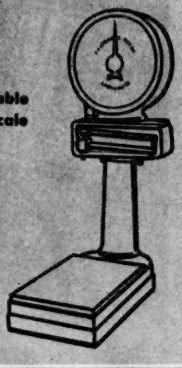
101 East 12th St. • ERIE, PA.



Bench Scale



Printomatic Dial Scale



Portable Dial Scale

The easy WAY to WEIGH FAIRBANKS-MORSE Scales

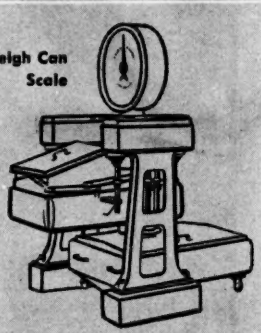
Fast, accurate, easy-to-read, easy-to-handle Fairbanks-Morse Scales offer the easy way to "weigh." Because these lastingly accurate weighing instruments are designed for fast, dependable operation . . . for maximum ease of reading, they speed weighing operations . . . minimize the chance of costly human error.

There is a Fairbanks-Morse Scale for every weighing operation. Your Fairbanks-Morse weighing expert will be glad to assist you in selecting the right style and size for your operations. Fairbanks, Morse & Co., Chicago 5, Ill.

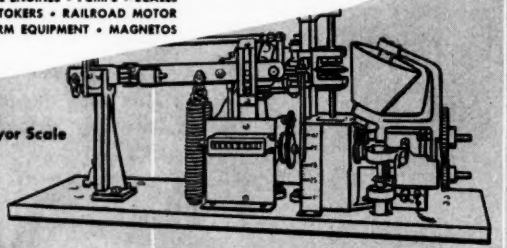
FAIRBANKS-MORSE

A name worth remembering

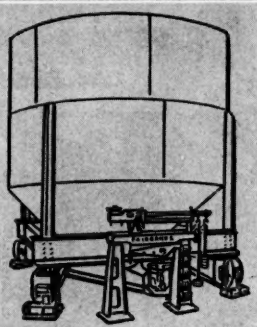
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES
MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS



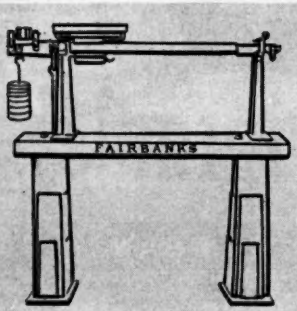
Weigh Can Scale



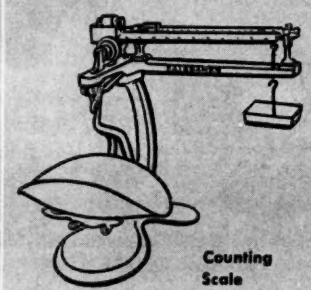
Belt Conveyor Scale



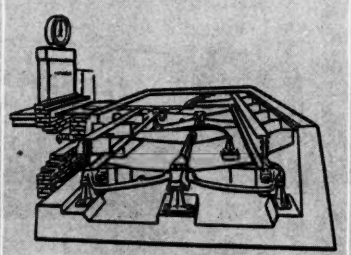
Hopper Scale



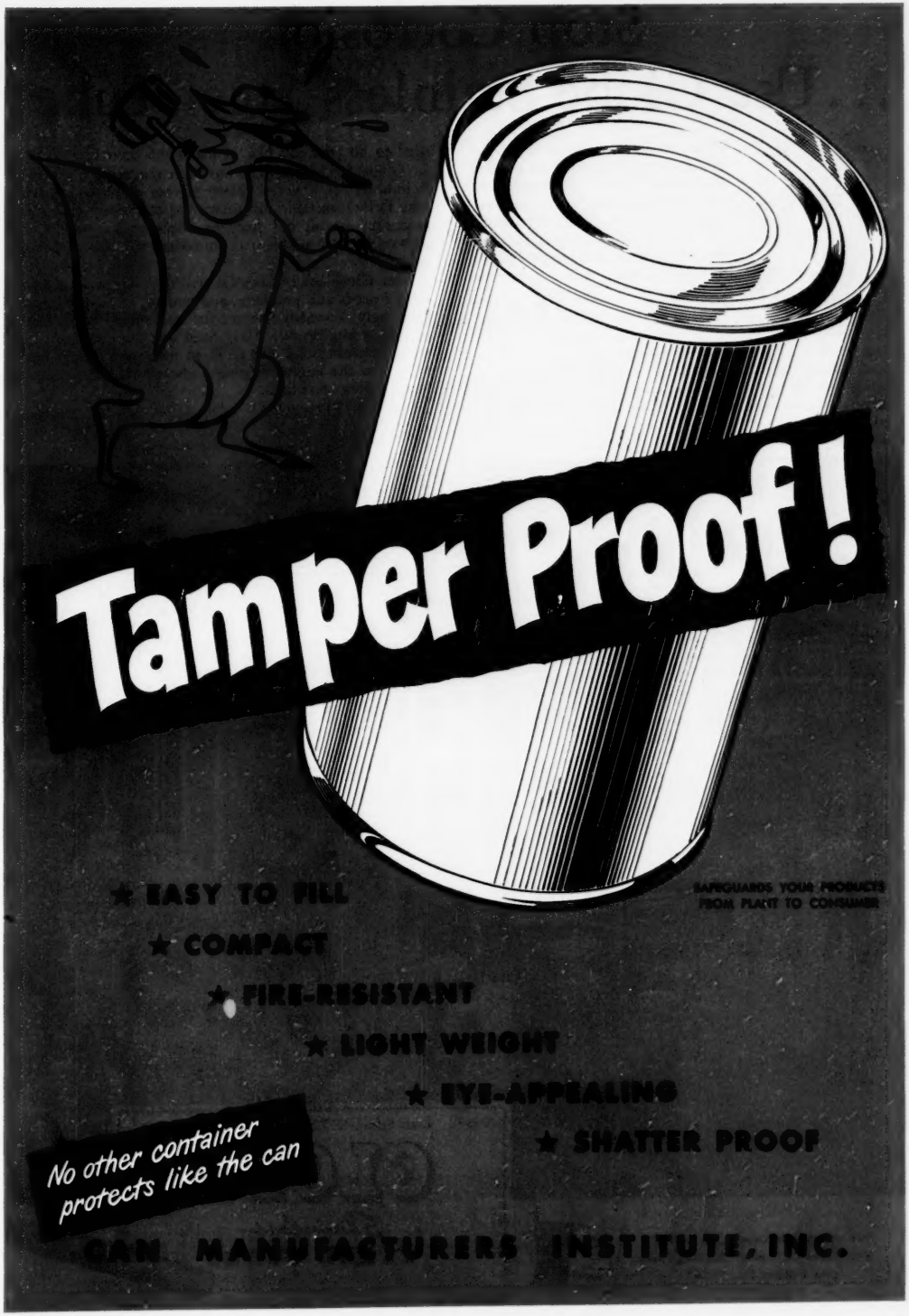
Full Capacity Beam



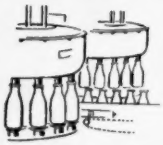
Counting Scale



Truck Scale


Tamper Proof!
★ EASY TO FILL
★ COMPACT
★ FIRE-RESISTANT
★ LIGHT WEIGHT
★ EYE-APPEALING
★ SHATTER PROOF
SAFEGUARDS YOUR PRODUCTS FROM PLANT TO CONSUMER
No other container protects like the can
CAN MANUFACTURERS INSTITUTE, INC.

Stop Corrosion ...Use Globe Stainless Steel Tubes



When corrosion is found in tubing or metal parts formed from tubing, Globe Steel Tubes Co. can help you solve that problem. Not by suggesting just any stainless steel tubing . . . but by recommending the correct analysis and metallurgical properties of the Globe Stainless Steel Tubing to best meet your specific operating conditions.

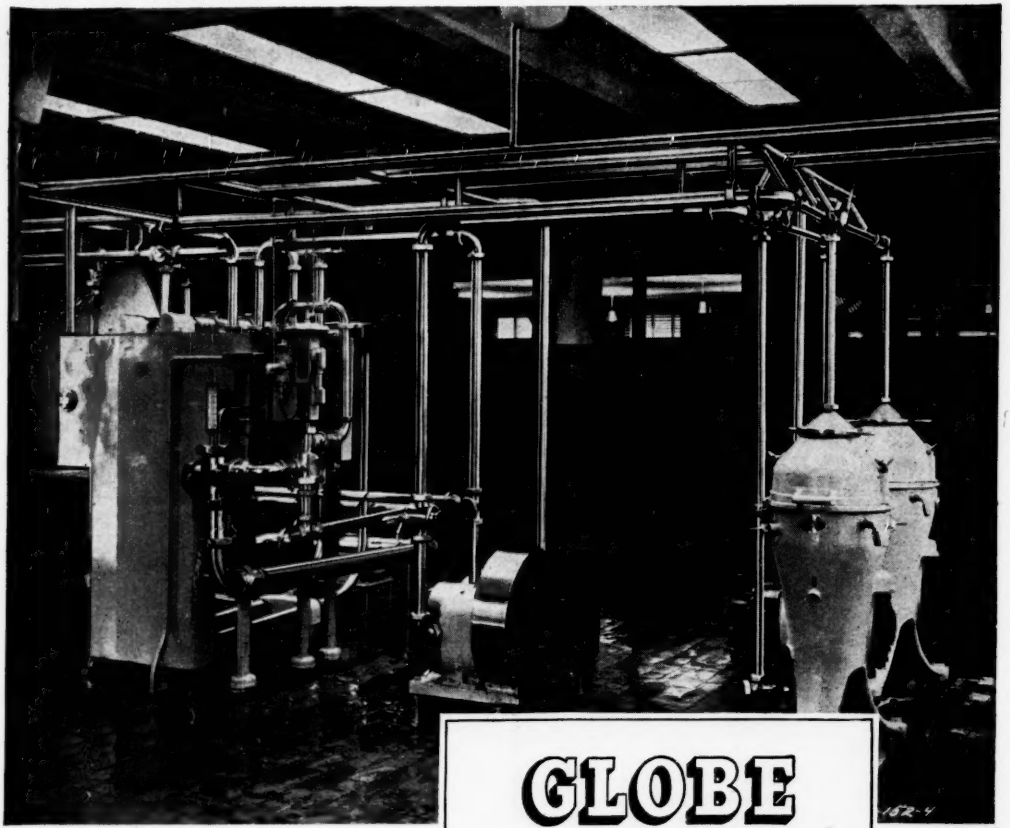
Globe Steel Tubes Co. can do this because they study the problem in cooperation with your engineers in your plant and in Globe's completely equipped metallurgical, physical and chemical laboratories. Result: You get recommendations for the specific analysis and metallurgical properties of stainless steel tubing in the size and finish you need to do your job best at maximum economy.

Globe Steel Tubes Co. has been rendering this service to industry for 40 years. Many of your problems involving tube failure, metallic contamination, corrosion, scaling and sanitation are an old story to Globe. Chances are, the answer to your problem is immediately available for the asking.

Let Globe Steel Tubes Co. assist you in surveying your tubing needs and problems, and you are assured of an outstandingly dependable source for steel tubing of all kinds: Stainless, Mechanical, Alloy Steel and Pressure . . . in a wide range of sizes and types to meet your requirements . . . plus the engineering and research facilities to solve your tubing problems.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin

Photo courtesy Creamery Package Mfg. Co.



GLOBE
Stainless
STEEL TUBES

Free valuable technical data in Globe Steel Tubes Co.'s new "Bursting Pressure Bulletin No. 112A".

AS NEAR AS YOUR TELEPHONE

A new V-Belt service by Dayton, to save you time and money three ways:

1. "Drive Proved" V-Belts—the right belt for your particular drive. For Dayton has made more than 100 million V-Belts. They have been "Drive Proved" in every kind of industry, under every possible operating condition of heat, cold, dirt, dust and oil. They have proved their ability to save space; provide positive power; start and stop smoothly; run quietly, without vibration and last longer than any ordinary belt.

2. As Near as Your Telephone. There is a Dayton V-Belt Distributor near you. He is equipped with the specialized knowledge to recommend the right drive for you. You'll find him listed in the classified section of your telephone directory or his representative is now calling at your plant.

3. Instant Maintenance Service from Local Stocks. Your Dayton Distributor maintains complete stocks of Dayton "Drive Proved" V-Belts and pulleys. He is prepared to give you instant service for existing or future drives, and to provide you with an immediate source of mill supplies.

Put this new service to work in your plant now. Equip your drives with Dayton "Drive Proved" V-Belts and be sure you are getting the maximum in drive performance and service. Call your Dayton V-Belt Distributor today. *The Dayton Rubber Company, Dayton, Ohio.*

ONLY Dayton V-Belts are "DRIVE PROVED" for the Job!

Dayton Thorobred—for normal and heavy duty drives.
Dayton FHP—for small machines and appliances.
Dayton Cog—for shortest centers, smallest pulleys.
Dayton Steel Cable—for extreme loads and speeds.

ALL STOCKED BY YOUR LOCAL DAYTON V-BELT DISTRIBUTOR

Dayton Rubber

modernize your power system the load-center way

—for better power utilization today, lower-cost expansion tomorrow!

To help offset today's squeeze on food processing profits, load-center power distribution can bring you cost-saving features that mean plenty. This modern method of distributing incoming power—at high voltage from a master unit substation to small unit substations located in the heart of load areas—offers you:

High equipment efficiency. You eliminate excessive voltage drop caused by long low-voltage feeder runs—voltage drop that slows down conveyors, dims lights, reduces oven heat.

Ease of change and expansion. You can shift processing lines, or add new ones, without being tied down by an inflexible power system. And unit substations are easy to move, if your plant must be relocated or rearranged.

Personnel safety. All equipment is metal-enclosed and effectively grounded, with no exposed parts to create a hazard.

Reduced maintenance costs. There are no exposed, dust-catching cables or devices to require frequent cleaning and servicing.

Space-saving compactness. Unit substations take up less space than separate components. With no special protection needed, they can go anywhere near load centers—along walls, in basements, on balconies, or roofs.

Easy installation. Factory-assembled and tested, unit substations come ready to install without delay. And generally, an installed General Electric load-center system costs less than older, piecemeal methods!

If you're planning to put in a new power system, or modernize an existing one, why not consult a General Electric application engineer? Familiar with food processing needs, he'll gladly work with you on a one-line diagram as a first step. Meanwhile, send for illustrated booklet, "What load-center power distribution can do for you." *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

POWER DISTRIBUTION SYSTEMS FOR FOOD PLANTS

GENERAL ELECTRIC

Placed close to loads, unit substations eliminate the 10-20% voltage drop common to long, low-voltage feeders. In this Midwest beet sugar plant, a G-E unit substation supplies power for controlling diffuser, washer house, beet receiving area, and pulp drying equipment.

Compact and space-saving, unit substations come ready for quick, inexpensive installation. Here, another G-E unit substation supplies power to centrifugals, granulators, and other dry sugar machines.

SEE THIS FILM!

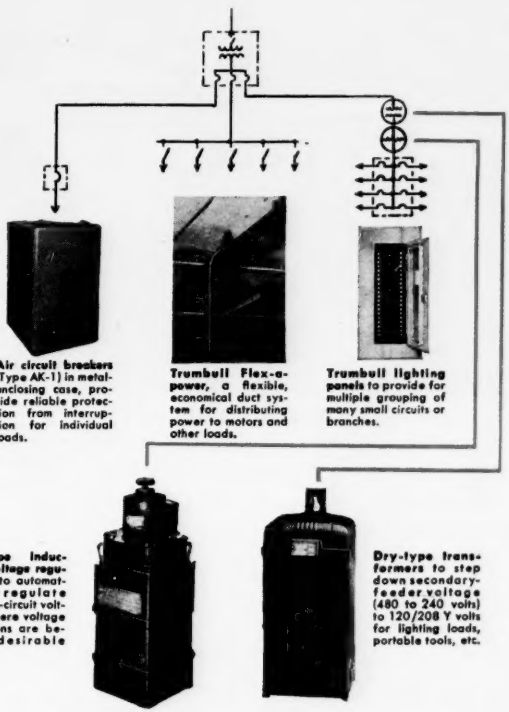
A G-E color sound slidefilm, "Modern Industrial Power Distribution," presents the whole story on load-center distribution. Ask your nearest G-E office about showing it to your personnel.

More Power to America

WHEN YOU GO "LOAD CENTER" GO GENERAL ELECTRIC *ALL THE WAY*

Complete General Electric load-center unit substations for food plants include a metal-clad incoming-line section with magne-blast power circuit breakers, a Pyranol transformer section, a low-voltage feeder section with drawout air circuit breakers, current transformers, buses, protective and disconnecting devices—all co-ordinated into one compact, easy-to-install unit.

In addition, the following associated equipment for load-center systems can also be provided by General Electric where desired—to make it G-E all the way:



Air circuit breakers (Type AK-1) in metal-enclosing case, provide reliable protection from interruption for individual loads.

Trumbull Flex-a-power, a flexible, economical duct system for distributing power to motors and other loads.

Trumbull lighting panels to provide for multiple grouping of many small circuits or branches.

Dry-type induction voltage regulators to automatically regulate lighting-circuit voltage where voltage variations are beyond desirable limits.

Dry-type transformers to step down secondary-feeder voltage (480 to 240 volts) to 120/208 Y volts for lighting loads, portable tools, etc.

WANT MORE DATA?

General Electric Company, Section 652-1
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

- ☐ GEA-3758—Load-center power distribution
- ☐ GEA-4322—Electric equipment for the food industry

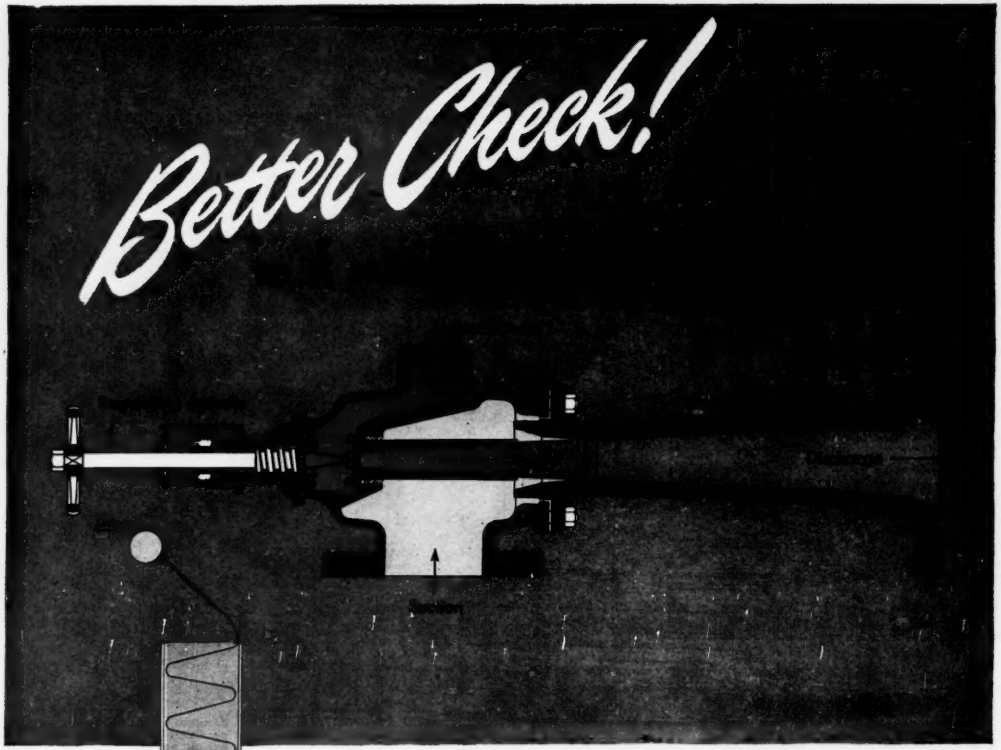
Name.....

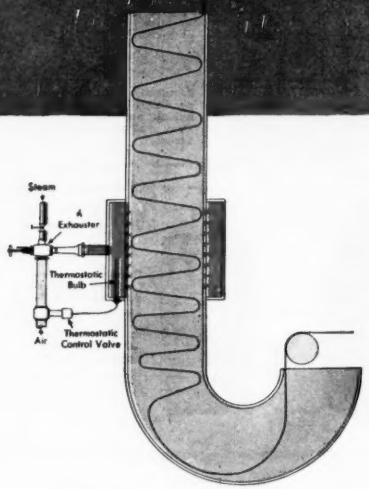
Company.....

Street.....

City..... State.....

Better Check!





This application shows an SK Exhauster being used on a textile mill J-Box to mix steam and air, in proportion, for the uniform bleaching of cloth. It is but one of many applications featuring the adaptability of the Jet.

If you have a process problem involving pump priming, exhausting, evacuating, cleaning, transporting, compressing or agitating, you might do well to investigate SK Steam Jet Exhausters and Compressors. Because these versatile air and gas pumps are employed universally in such operations where they frequently do the job better, faster and more economically. Using steam or compressed air as the operating medium, they entrain, compress and discharge air or vapors. Compact in design, simple in operation, without moving parts, they are available in bronze, iron, Monel, steel, Everdur, hard lead or Pyrex as conditions necessitate. For complete information on SK Exhausters and their many applications, send for a copy of new Bulletin 4-E.

SCHUTTE and KOERTING Company

Manufacturing Engineers

1157 THOMPSON STREET • PHILADELPHIA 22, PA.

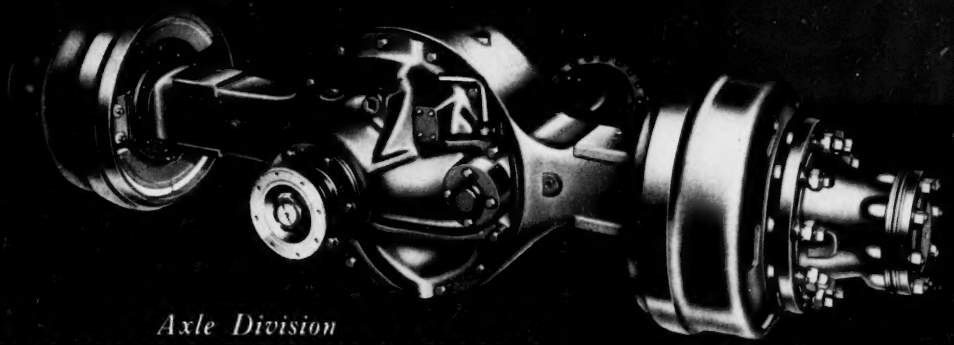
JET APPARATUS • HEAT TRANSFER EQUIPMENT • STRAINERS • CONDENSERS AND VACUUM PUMPS • OIL BURNING EQUIPMENT • ROTAMETERS AND FLOW INDICATORS • RADIAFIN TUBES • VALVES • SPRAY NOZZLES AND ATOMIZERS • GEAR PUMPS • DESUPERHEATERS

EATON AXLES

Allow Engines to Run at most Efficient Operating Speeds

Pulling out under full load, making time on the hills, or high-balling on the straight-away—there is an operating speed range that's best for your engine—best for performance, for operating economy, and for engine life. Eaton 2-Speed Axles permit engines to run in this top-efficiency range under all conditions of road and load. This results in lower operating and maintenance costs, and longer life for the entire vehicle. Eaton 2-Speed Axles are available for most trucks of the 1½ ton class and larger. See your truck dealer for complete information.

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

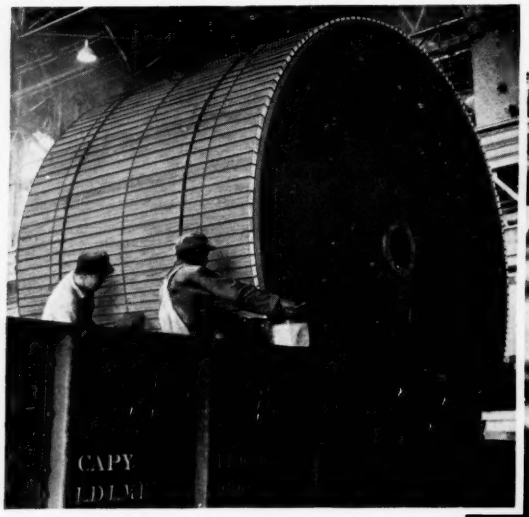
EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

OTHER EATON PRODUCTS

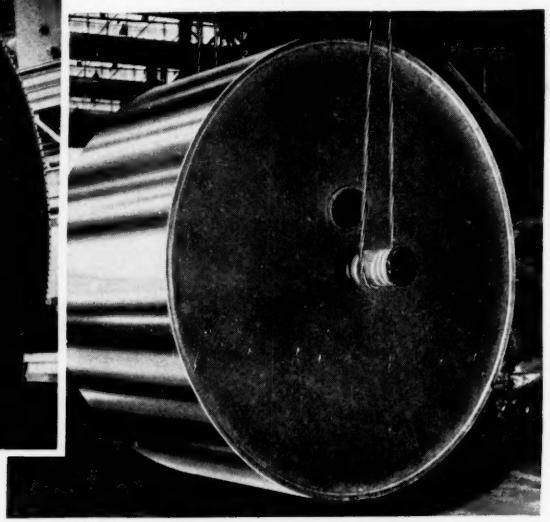
SODIUM COOLED VALVES • POPPET VALVES • FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • PERMANENT MOLD GRAY IRON CASTINGS • ROTOR PUMPS
SPRING LOCK WASHERS • SNAP RINGS • COLD DRAWN WIRE • HEATER-DEFROSTER UNITS • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, AND DYNAMOMETERS

Another LUKENWELD Drier Roll
ON ITS WAY TO CHAMPION...



The seventh Lukenweld Drier Roll to go into this important service at Champion Paper and Fibre Company; shipped November, 1948. It is 12 feet in diameter, with an 8'4" face.

The first of these Lukenweld Drier Rolls was shipped to Champion, 12 years ago.



for a further boost in Kromekote* production

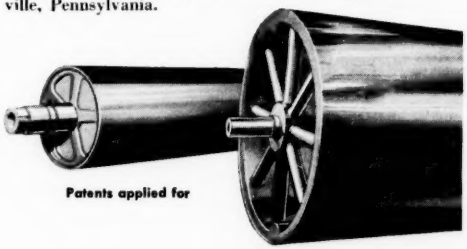
Kromekote's superb printing properties depend upon the uniformity and perfection of this paper's coating. A Lukenweld Drier Roll helped Champion develop the revolutionary methods which gave Kromekote those properties way back in 1937. Six additional Lukenweld Drier Rolls have since been added to take care of the ever-increasing demand.

Repeat orders received regularly from the various industries in which Lukenweld Drier Rolls are working—paper, chemical, drug, food, plastic and other industries—are evidence of their worth. Their welded steel plate construction is strong and dependable; high pressures are employed with safety. Simple in construction, there's nothing to get out of order.

Where Lukenweld Drier Rolls have replaced other rolls, production increases of 18% to 35% have been reported. This is accounted for by the positive removal of condensate and higher steam velocities obtained. Heat is transferred to roll faces rapidly and uniformly.

If you have a drying problem . . . In addition to supplying the drier rolls, Lukenweld will design, build and install the complete drying machine. Our engineers can help you speed up production, cut costs and improve products.

For a copy of Bulletin 358 on Lukenweld Drier Rolls or for other drying help, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.



Patents applied for

*T. M. Reg. U.S. Pat. Off. for Champion's Cast Coated Paper

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

NOW! A NEW VAPOR PEELER

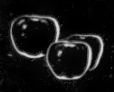
VIRTUALLY ELIMINATES SLIP PEELING!

NEW! ATLAS★PACIFIC SUPER-HEATED VAPOR PEELER

Utilizes Ideal 650° Temperature . . . Yet Operates From Regular Steam Line!

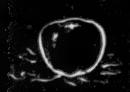
Research proves that one quick application of 650° super-heated steam gives perfect peeling results. Even green-picked tomatoes, freestone peaches, peppers and potatoes shed their skins like magic. A far shorter time is necessary, skins are thinner, and *there is far less pre-cooking.* As a result, Atlas-Pacific engineered this new Super-Heated Vapor Peeler, which is smaller, virtually 100% thorough, and produces a solid, whole, fancy peeled product. It will operate from your present steam line, and will give greater tonnage with less labor—at lower cost—than any peeler made today.

PEELS MORE KINDS OF PRODUCTS



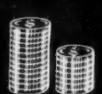
100% "FANCY PEELED PRODUCT"

LESS PRE-COOKING OF PRODUCT



THINNER PEEL—GREATER YIELD

SAVES HUNDREDS OF SQUARE FEET



FAR LOWER FIRST COST

6 TONS PER HOUR CAPACITY

ATLAS-PACIFIC ENGINEERING COMPANY, INC.

1321 67th St., Emeryville, Calif.

FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

$127.50 Monthly Profit from Orange Oil Formerly Lost

(reported by J-M Engineer H. G. Martin)

LOS ANGELES DISTRICT: A citrus processor in my territory uses high-speed centrifuges for orange oil recovery. After two weeks' operation, there is an accumulation of about 100 gallons of sludge, which has a high content of orange oil. Settling and decanting this sludge yields 75 gallons of oil. By adding Celite to the remaining 25 gallons of heavy sludge formerly discarded and then pressing it, 5 more gallons of orange oil are recovered. Selling for $1.50 per pound, this means a saving of $130.00 in additional orange oil per month. Deducting $2.50 for the cost of Celite used, the operation shows a monthly net profit of $127.50.

Sales Appeal Improved with Celite 545

(reported by J-M Eng. W. A. Reschke)

CHICAGO DISTRICT: A trial run convinced this customer that he had much to gain and nothing to lose by using Celite as a pressing aid in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Previously, without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. Customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a considerably longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite 545 to each 900-lb. batch of grapes pressed.

Filter Trouble Corrected with Hyflo*

(reported by J-M Engineer R. J. Amberg)

DETROIT DISTRICT: A wine company reported trouble with a new filter which they had installed recently and I was called in to assist.

The problem was to handle the settlings from several thousand gallons of wine without increasing the amount of filter aid which they had been using. The wine is pumped from the main cask to a 260-gallon mixing tank and from there to the filter. There are no facilities for pre-coating with anything but unfiltered wine. We put ten pounds of Hyflo in 200 gallons of wine in the mixing tank and circulated this until clarity was obtained. This was a matter of only a few minutes. The clear filtrate was then turned to a receiving tank. The flow rate was estimated at 6 gallons per square foot of filter area per hour after filtering about 200 gallons.

*T. M. Reg. U.S. Pat. Off.

Engineering Help Solves Filtration Problem

(reported by J-M Engineer G. F. Huber)

BOSTON DISTRICT: One of my customers was having difficulty due to the filter powder coming through the ceramic filter medium. I checked the operation with their technical director and found that incomplete venting of the air from the filter body during precoating permitted air to remain trapped in the upper part of the filter. This prevented the precoat suspension from filling the filter and depositing an even coat upon the stone. As the filtration was continued, the liquid level in the filter rose and gradually displaced the air but meanwhile, of course, some filter aid passed through the stone.

I suggested complete air venting at the start of the precoating and installing a valve on the outlet side. This change in operation resulted in a decided improvement and, needless to say, the customer was greatly pleased.

Your New Problem may be an old one to the CELITE Engineer

These case histories show not only what Celite Filter Aids can do but also how Johns-Manville Filtration Engineers can help you. Small, simple changes in equipment or technique often lead to big results because J-M Engineers combine scientific knowledge with wide practical experience on many filtration problems. In addition, they have access to the resources of the J-M Research Laboratory where modern filtering techniques and filter aids were developed.

For additional information, write Johns-Manville, Box 290, New York 16, New York.

Johns-Manville JM PRODUCTS

***Celite* Filter Aids**

Reg. U. S. Pat. Off.

Mundet Corkboard is a Money-Saving HEAT & MOISTURE BARRIER

Perishables in this cold storage room are protected by Mundet Corkboard in floors, walls and ceiling. Inset shows Corkboard being installed in ceiling of freezer. All joints are vapor-sealed.

Mundet Corkboard is a time-proved heat and moisture barrier . . . serving at top-efficiency in hundreds of quick freezing and frozen food locker plants, in cold storage rooms and food processing plants. Whether you have small or large facilities for low temperature, you need Mundet Corkboard for these dollar-saving advantages:

LOW CONDUCTIVITY Mundet Corkboard provides the most efficient barrier to heat transfer due to its internal cellular structure of sealed dead-air spaces.

STRUCTURAL STABILITY The cellular structure of Mundet Corkboard maintains its shape and characteristics under rigorous conditions of service.

NON-ABSORBENCE Mundet Corkboard has no capillary attraction. This nature-made quality avoids absorption of dampness and odors. There is no swelling or loss of insulating value from moisture infiltration.

EASE OF INSTALLATION Mundet Corkboard is light in weight despite its strength. It cuts easily, readily holds nails or skewers; bonds with cement, asphalt or paint.

LONG-LIFE There is only one way to figure insulation cost. That is the over-all 'life-expectancy' of the material. Here, again, Corkboard is the choice, with thousands of installations to prove its durable service.

The best insulation requires competent installation. You benefit from the experienced erecting services that are offered by Mundet branch offices. Corkboard is available for prompt shipment from nearby warehouses. Send coupon for copy of Mundet Cork Manual. Prepared in convenient filing size, with cork specification data.

MUNDET CORK CORPORATION
Insulation Division
7101 Tonnelle Ave., North Bergen, N. J.

Please send copy of Mundet Cork Insulation Catalog in handy reference size.

Name.....

Company.....

Address.....

City.....*Zone*.....*State*..... FI-4

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CHARLOTTE, N. C.
206 E. Stonewall St.

CHICAGO 16
2601 Cottage Grove Avenue

CINCINNATI 2
427 West 4th Street

DALLAS 1
601 Second Ave.

DETROIT 21
14401 Prairie Street

HOUSTON 1
Commerce and Palmer Streets

INDIANAPOLIS
15 E. Washington St.

JACKSONVILLE 6, FLA.
800 E. Bay St.

KANSAS CITY 7, MO.
1428 St. Louis Avenue

LOS ANGELES
(Maywood)
6116 Walker Avenue

NEW ORLEANS 16
315-25 N. Front Street

PHILADELPHIA 39
856 N. 48th Street

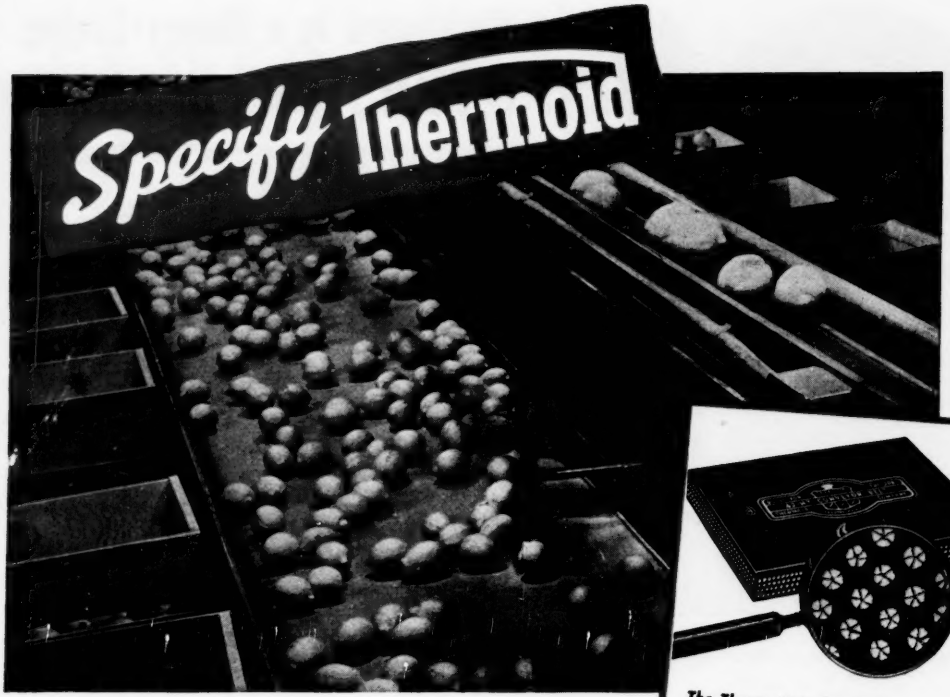
ST. LOUIS 4
2415 South Third Street

SAN FRANCISCO 7
440 Brannan Street

In Canada:
Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

MUNDET
CORK INSULATION



Thermoid Impregnation Process Assures Longer Conveyor Belt Life

Thermoid Conveyor Belts are Built for the Job!

For over 68 years, Thermoid has worked with packers and canners to develop rubber products to meet the many problems encountered in food processing industries. The result—a complete line of Thermoid Conveyor Belts for every packing and canning requirement.

Your nearest Thermoid distributor can service your requirements . . . or if you prefer, write us of your problem and we will furnish full details.

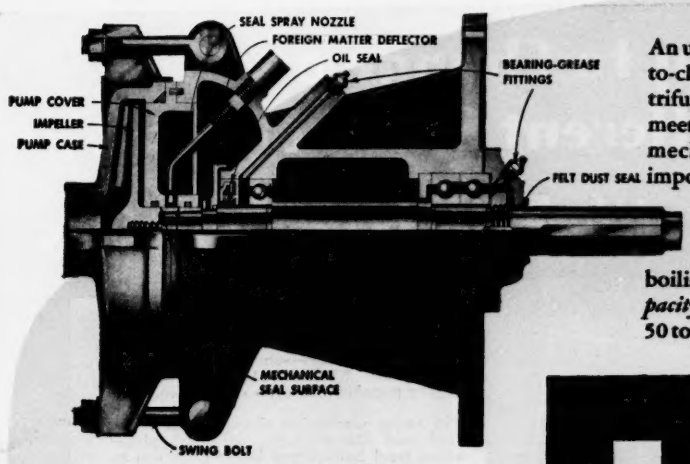
It will pay you to ***Specify*** Thermoid!

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

Thermoid Company

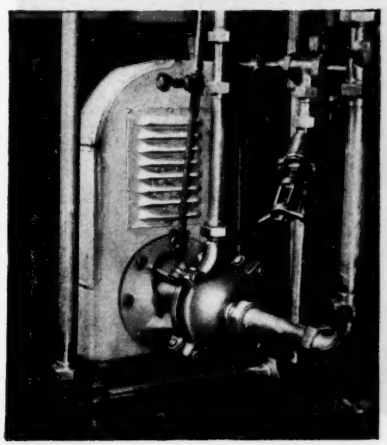
Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U.S.A.
Industrial Rubber Products • Friction Materials • Oil Field Products



An unusually compact, easy-to-clean, selective speed centrifugal pump... designed to meet exacting sanitary and mechanical requirements imposed by food evaporation processes that operate under high vacuums and high boiling temperatures. *Capacity:* 20 to 100 gpm. *Head:* 50 to 200 ft. *Speed:* Selective.

The New BJ Sanitary Food Process Pump

This is one of a large number of BJ Sanitary Food Process Pumps installed by Golden State Co., Ltd. For standard application, pump is mounted on sturdy sheet-metal cabinet containing drive motor, as indicated. Selective Vee-belt drive provides for flexible adaptation to variable power and speed conditions. Discharge nozzle can be rotated to any one of four positions. If desired, pump is sold separately for special mounting.



CONVENIENT DISMANTLING AND CLEANING—Pump can be dismantled for cleaning with a few simple manipulations. Case is held by four swing bolts, impeller by a simple bolt threaded into impeller hub.

MECHANICAL SEAL—A simple, water-cooled-and-lubricated mechanical seal assures a trouble-free, easily cleaned stuffing box.

STANDARD SANITARY FITTINGS—Suction and discharge nozzles are machined to receive standard sanitary fittings.

STAINLESS STEEL—All parts that contact pumped liquid are of polished 18-8 stainless steel.

Byron Jackson Co.

LOS ANGELES 54, CALIFORNIA

Offices in Principal Cities

It's Easy to Change over for Different Size Bottles . . .

with NORTON Labelers

YES, it's *really easy* to change over for different size bottles—and it's a feature that makes the NORTON OSLUND Labeler mighty popular with users everywhere.

The major mechanism changes such as the feed and discharge turrets, label picker arms, label holders and bottle grips can be quickly and easily made. Then with a few simple adjustments the machine is *ready to go again.*

And best of all, the number of parts necessary for each size change are relatively few so that *equipment expense is not a large item.*

Send for catalogs on Norton Single and Duplex Labelers. You'll also like their simplicity of design and sturdiness of construction that assure *trouble-free, economical operation.*

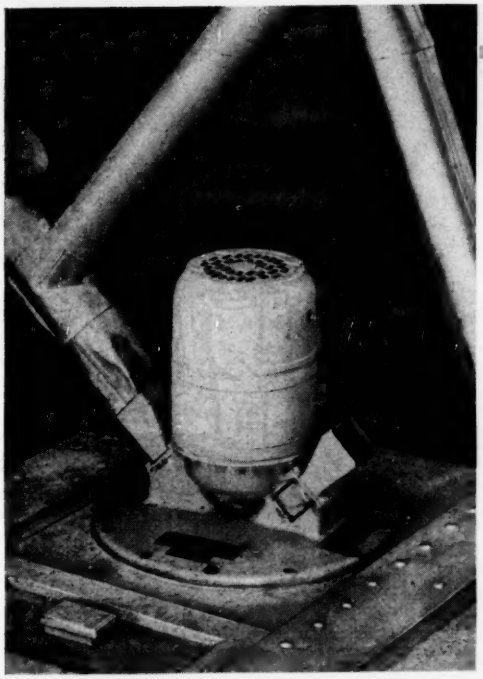
NORTON COMPANY Worcester 6, Mass.

Labeler Section

NORTON

AUTOMATIC LABELERS

Continuous Insect Control for Food Plants



This "ENTOLETER" Centrifugal Machine protects doughnut mix ahead of packing

THE BEST WAY to safeguard food products and ingredients from insect infestation is to have the continuous protection of "ENTOLETER" Insect Control.

Insect control, to be truly effective, must be a continuous process . . . it must destroy all stages of insect life in free flowing dry materials: eggs, larvae, pupae and adults. This is an important advantage of the "ENTOLETER" System. Simply installed, its mechanical action gives a complete and continuous kill.

"ENTOLETER" Control protects incoming materials, materials before and after storage, and your finished products before packaging. By destroying all insect life, the threat of insect multiplication is eliminated, and food materials are protected from adulteration by insect excreta.

NEW BULLETIN describes important applications for "ENTOLETER" Centrifugal Machines. Whether or not you now have "ENTOLETER" equipment, you can benefit from the information in this folder. Send for your copy today.

Foreign distributors
HENRY SIMON LTD., STOCKPORT, ENGLAND

ENTOLETER
CENTRIFUGAL MACHINES

CONTINUOUS INSECT CONTROL SYSTEM

ENTOLETER DIVISION

The Safety Car Heating and Lighting Co., Inc.
P.O. Box 904, New Haven 4, Conn.

Send full information on "ENTOLETER" Continuous Insect Control System.

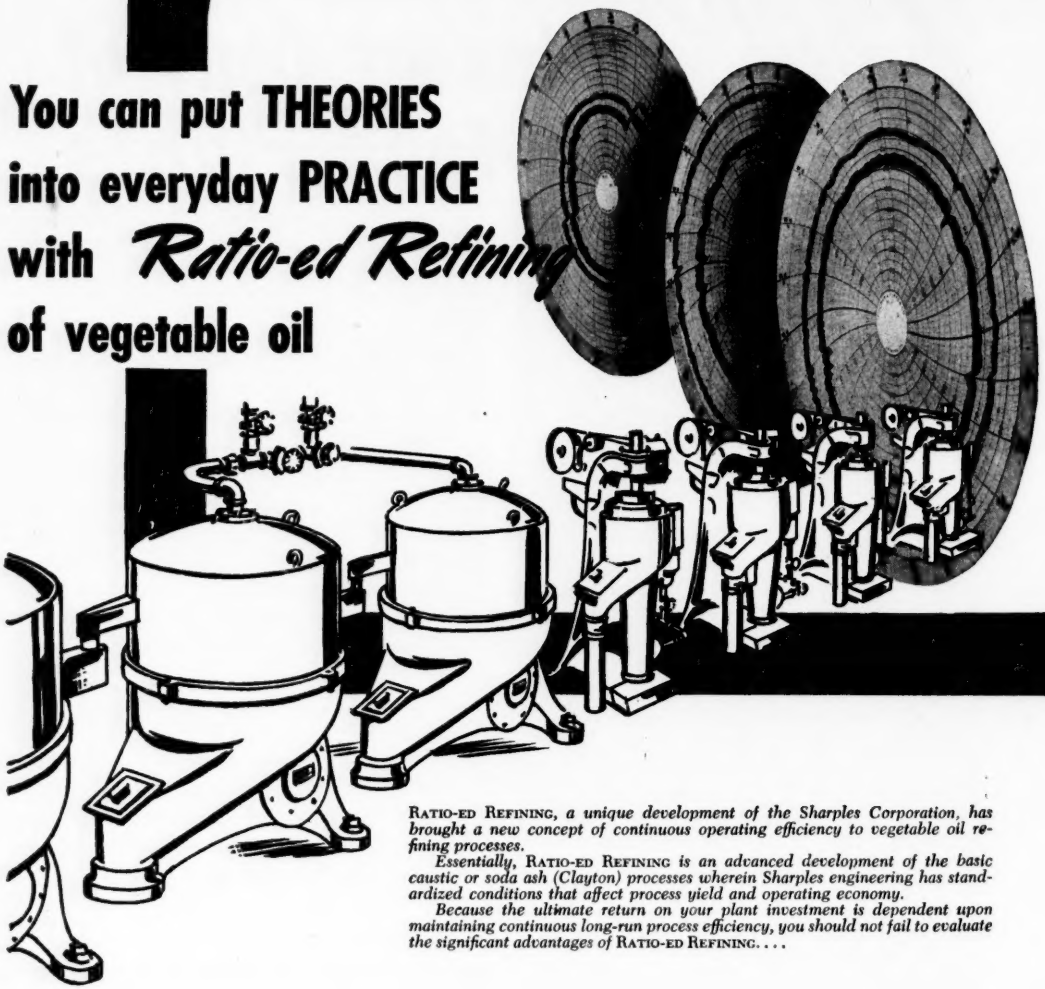
Name .....

Company .....

Address .....

City, Zone and State .....

You can put THEORIES into everyday PRACTICE with *Ratio-ed Refining* of vegetable oil



RATIO-ED REFINING, *a unique development of the Sharples Corporation, has brought a new concept of continuous operating efficiency to vegetable oil refining processes.*

Essentially, RATIO-ED REFINING *is an advanced development of the basic caustic or soda ash (Clayton) processes wherein Sharples engineering has standardized conditions that affect process yield and operating economy.*

Because the ultimate return on your plant investment is dependent upon maintaining continuous long-run process efficiency, you should not fail to evaluate the significant advantages of RATIO-ED REFINING. . . .

SHARPLES—CENTRIFUGAL AND PROCESS ENGINEERS

To maintain efficiency is harder than to achieve it

The significant advantages of *Ratio-ed Refining* are best realized when your plant is in regular operation. Whereas both the caustic and soda ash processes are sufficiently standardized that they can be "tuned-up" to efficiency, *Ratio-ed Refining* —by its mere nature of automatic measurement, control and adjustment of the variable factors—acts *itself* to maintain efficiency at all times. While it is one thing to proportion the feed of caustic soda and oil to the process, in *Ratio-ed Refining* the actual flows are measured and a positive ratio is consistently maintained. In fact, if for any reason the proper ratio cannot be maintained, the controlling "brain" immediately sounds an alarm for the operator.

With *Ratio-ed Refining* you *know* that refining losses are always at a minimum and that quality is always up to standard.

FINGER-TIP FLEXIBILITY

One man per shift can operate an entire Sharples refining plant. Reagent strength can be changed at any time, even during operation, by a simple adjustment of the ratio controller. On Clayton process installations, neutralization and color reduction are independently adjusted—giving flexible, precision control of the two most important factors—yield and color.

DEFINITE PROCESSING, DEFINITE RESULTS

When you install Sharples Vegetable Oil Refining equipment, you get no temperamental process. You can readily obtain a consistent maximum yield with good color reduction because *Ratio-ed Refining* has taken the "art" out of vegetable oil processing and reduced it to a routine procedure.

Experience—measured in tank cars

257 tank cars per day of vegetable oil represents the capacity of Sharples plants installed during the past 17 years. No other manufacturer can approach this record—and the experience that goes with it.

We can truly say, "We've sent a lot of refined vegetable oil on its way" because Sharples service goes so far beyond merely furnishing equipment that we feel like partners in actual production.

Sharples engineering is complete and individually developed for your plant. If you have equipment now, Sharples engineers will see that it is used as far as possible. Sharples engineers also supervise installation and train operators, trouble-shoot and keep a trained eye on your new plant until it is functioning properly. And that is not all . . . Sharples Nationwide Service is always at your immediate call.

If you refine vegetable oils of any kind, and are contemplating continuous operation by the caustic or soda ash methods, or would like to see the advantages of converting to the soda ash method, don't fail to evaluate the significant advantages of Sharples engineering and *Ratio-ed Refining*—one of Sharples contributions to the fine art of making more profit and a constantly high quality product.

Further information will be gladly furnished upon request.

The SHARPLES CORPORATION

SHARPLES

NEW YORK 17, N. Y. 501 Fifth Avenue — CHICAGO 4, ILL. 80 E. Jackson Boulevard — BOSTON 10, MASS. 220 Congress Street — SAN FRANCISCO 5, CALIF. 686 Howard Street — CLEVELAND 15, OHIO 453 Hippodrome Annex Bldg.

EXECUTIVE OFFICES AND FACTORY, 2300 WESTMORELAND STREET, PHILADELPHIA 40, PENNA.

You can always tell the Difference

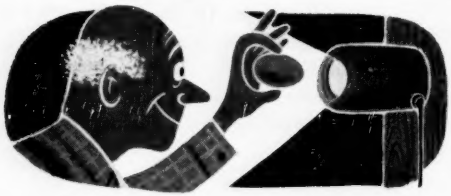
—by the Tests of the Trades

The Taste Test

In the paper industry, one of the good old tests of the trade is the taste test. An experienced man can tell by his sensitive taste if the exact amount of sizing is being mixed with the pulp.

The Bird Test

Many a man is alive today because of a little bird. You know the story . . . and nobody knows it better than miners who have "watched the birdie" to determine whether air in the shaft was safe or dangerous.



The Egg Test To most people, two eggs can look like twins. But to the man whose business is eggs it's an entirely different story. For the good of his business . . . for the sake of his profits . . . he must and *does* test each egg to count his chicks before they're hatched.

The On-The-Wall Test

Before plunging into the expense of painting his plant a wise paint buyer determines his total costs and final results by the *on-the-wall* test. He *compares* different paints . . . by the amount they can be safely thinned; by the number of square feet each gallon covers; by the time and labor required to paint a given test area; by the number of coats it takes to do the job right.

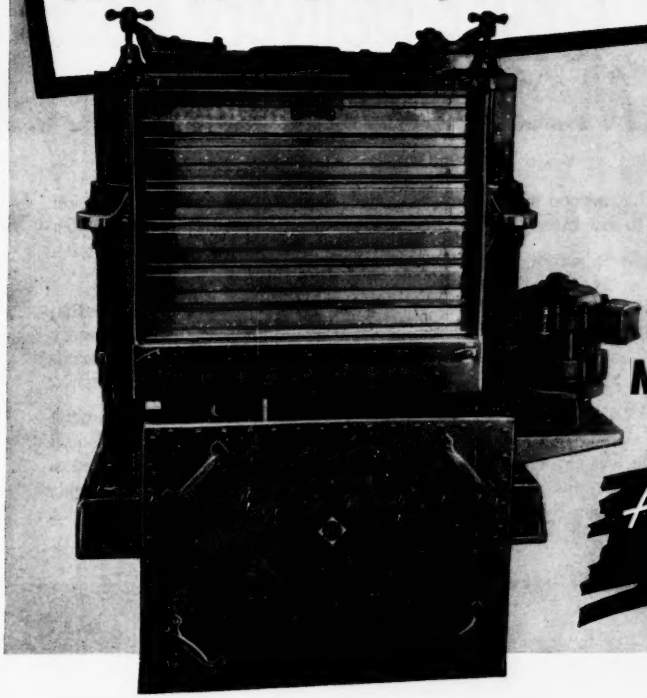
Through that kind of sound testing, plant operators find *without fail* that *Barreled Sunlight does a better paint job for less money than any other paint on the market*. This is no hollow claim. It is a fact we can *prove*. Your nearest Barreled Sunlight representative will gladly do it by demonstration. Write and he'll call at your convenience.

U. S. GUTTA PERCHA PAINT CO., 37-D DUDLEY ST., PROVIDENCE, R. I.

Barreled Sunlight *Paints*

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

It's NEW and it's SANITARY!



ALLIS-CHALMERS *ALL-METAL* GYRATORY SIFTER WITH EASY-TO-CLEAN MAGNESIUM SIEVES

Available Now for Quick Delivery

HERE'S the *newest* in sanitary Low-Head sifters! It's the Allis-Chalmers all-metal gyratory sifter —specially designed to give you improved sanitation in the grading and resifting operations in your food processing plant.

METAL CONSTRUCTION

The new Allis-Chalmers unit is of *all-metal* construction, light in weight but built strong for long, dependable operating life. All riveted joints are gasket-sealed to prevent leakage of fine materials. And—because the machine is made entirely of metal—there is no chance for cracks or crevices to develop.

HIGH SPEED UNIT

This *Low-Head* sifter is a high speed, high capacity unit. Each sifter holds 4 to 7 sieves . . . and is powered by a 1 hp explosion-proof Allis-Chalmers motor with quiet-running *Texrope* Drive. This sifter can handle high-temperature materials because there are *no* wooden parts.

EASY TO CLEAN

The all-metal sifter can be easily cleaned for quick product-handling changeover. All parts of the sifter can be *safely washed*. It's engineered and built for smooth performance, low maintenance. And it's available *now* for quick delivery!

Texrope and Low-Head are Allis-Chalmers trademarks.

Send coupon below for handy information packet with details on this new all-metal sifter and a copy of bulletin 06B6124A on the standard Low-Head sifter.

A 2617

ALLIS-CHALMERS, 1113A SO. 70 ST.
MILWAUKEE, WIS.

☐ Please send handy packet with information on new All-Metal sifter and standard sifter bulletin 06B6124A.

☐ Would like personal visit from A-C representative with details of new sifter.

Name .....

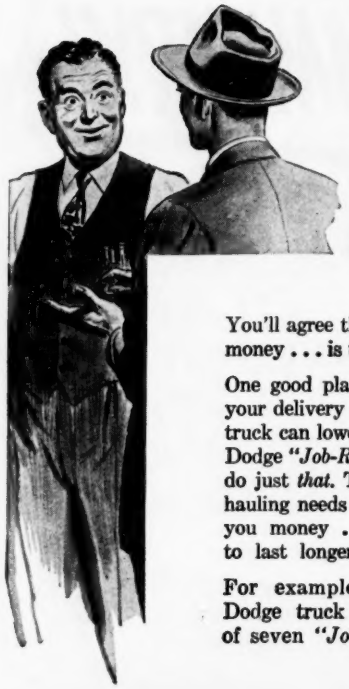
Company .....

Street .....

City ..... State .....

ALLIS-CHALMERS

Serving the Food Industry for 102 Years



FOOD MANUFACTURERS:

Lower Delivery Costs Mean Lower Overhead

You'll agree that a good way to *make* money . . . is to *save* money.

One good place to watch costs is in your delivery operation. For the *right* truck can lower delivery costs plenty! Dodge *"Job-Rated"* trucks are built to do just *that*. They're built to *fit* your hauling needs . . . save you money . . . and to last longer.

For example, every Dodge truck has one of seven *"Job-Rated"* truck engines. It is a high-compression engine of advance design . . . which insures maximum efficiency, with "top" economy.

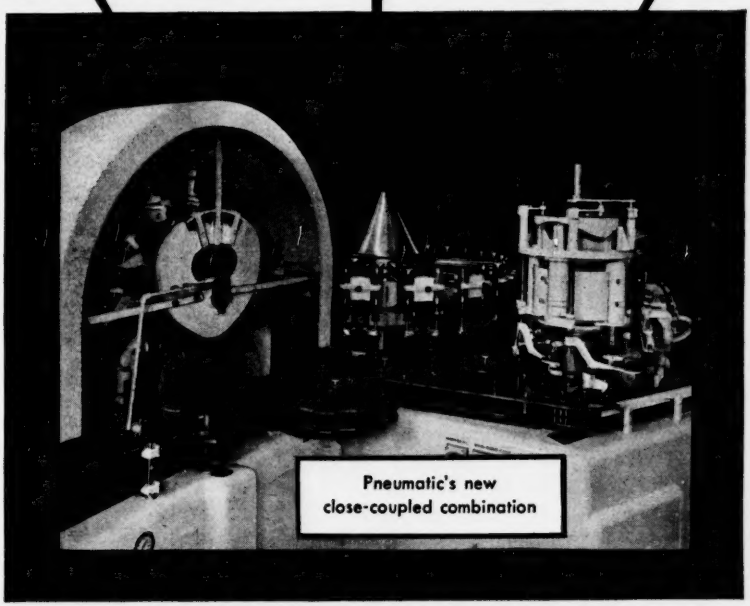
Each has exactly the right clutch, transmission, rear axle, and every other unit . . . *"Job-Rated"* for maximum dependability, and long life.

Let your Dodge dealer tell you the whole *"Job-Rated"* story. You'll quickly realize his story makes sense! And remember . . . *only* Dodge builds *"Job-Rated"* trucks.

For the good of your business—

Switch to "Job-Rated" DODGE TRUCKS

Now PNEUMATIC close-couples them for



speedier, space saving *Positive Control Bottling*

It's the biggest step forward in automatic bottling in a decade—and only Pneumatic, the one manufacturer making equipment for all major bottling operations, could have made this contribution.

By close coupling machines for bottle cleaning, filling and capping, Pneumatic has stepped up operating speeds along with a tremendous saving of floor space. The line is designed for smooth positive handling of glassware and involves a new principle of filling, wherein the container is "overfilled" and then the excess drawn off, resulting in exact fill height. This fill height may be varied without halting production. A Labeler attached to the close-coupled unit completes this hi-speed hook-up. Production of 120 full quarts per minute is now being attained on an installation already in operation and higher speeds are assured on smaller containers.

That's only part of the story. Pneumatic's Close-coupled combination offers many other advantages and operating improvements you should know about. Write us today about your bottling problem.

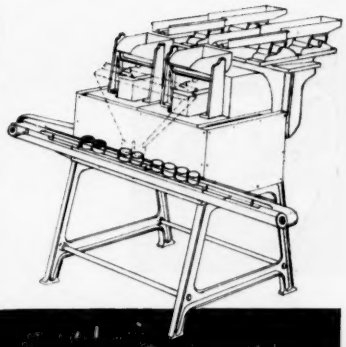
PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, North Quincy 71, Massachusetts. Branch Offices in New York, New York; San Francisco, California; Chicago, Illinois; Los Angeles, California; Seattle, Washington.

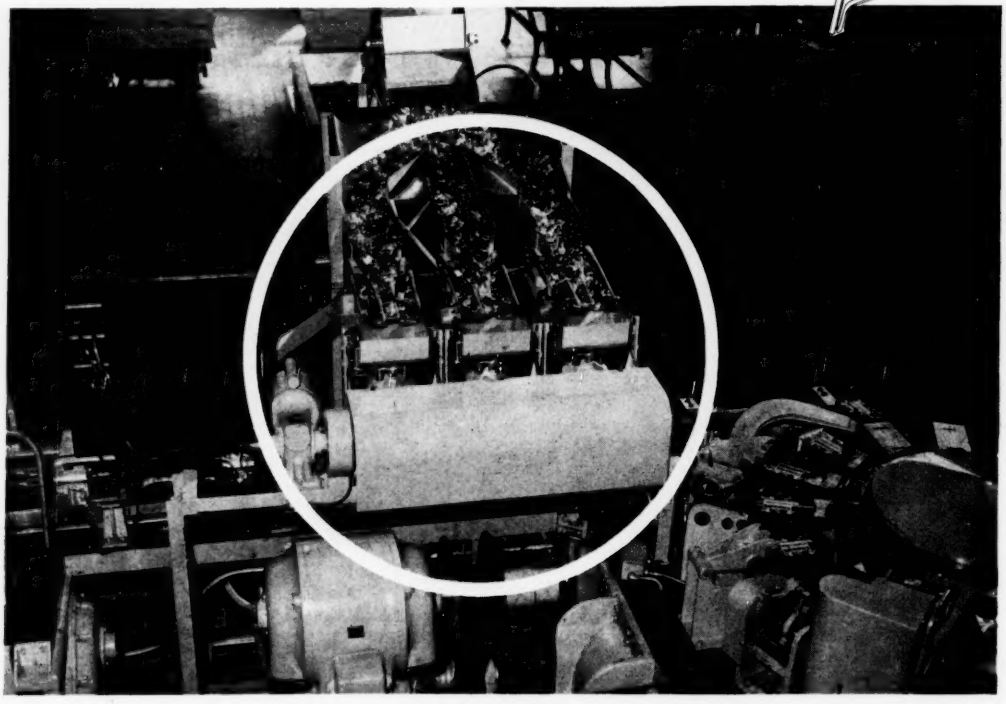
PNEUMATIC

PACKAGING AND BOTTLING MACHINERY

FIRST PUBLIC DEMONSTRATION!

Wright's new Hy-Tra-Lec Automatic Weigher Model "M" will be unveiled at the Packaging Exposition in Atlantic City. Two machines will be shown in action—one weighing and filling candy, and the other weighing and filling wood screws. If you cannot attend the Show, write now for literature describing this latest model of the most talked-about improvement in weighing equipment of the 20th century.



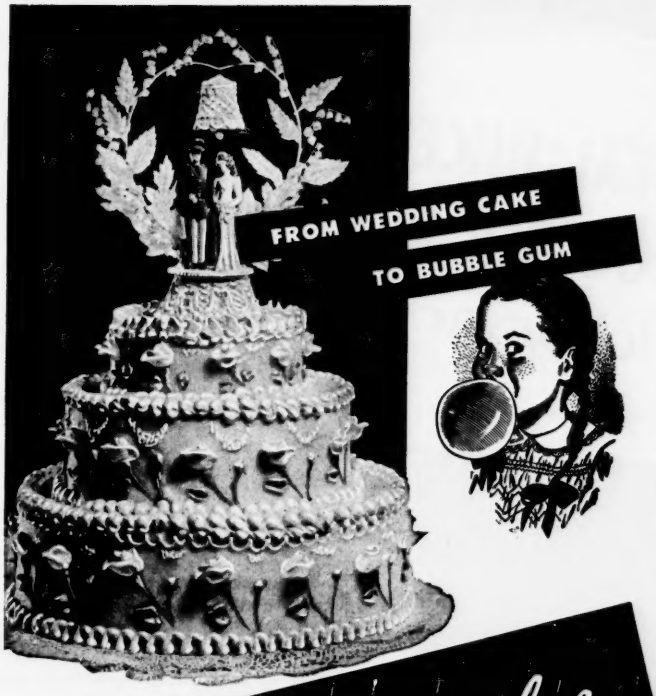


. . . don't be surprised

You probably have heard packaging experts talk about Wright's Hy-Tra-Lec Automatic Weighers. The principles incorporated in these machines—introduced in 1946—are new to food packaging machinery. "Positive displacement" is utilized rather than beam or spring scales. Definitely, a marked technical departure from conventional weighing methods. And—as proven by over 100 installations in leading food plants—a definite practical advance achieving greater accuracy at high speeds in net-weighing and filling operations for many products.

So don't be surprised at the large crowds which will surround Wright's exhibit at this year's Packaging Exposition in Atlantic City. Alert, economy minded food manufacturers want their products weighed and filled more accurately at high speeds. They want to see Hy-Tra-Lec. And they particularly want to see the new models which will be demonstrated publicly for the first time. Follow the crowd. Look to Wright.

WRIGHT
MACHINERY COMPANY
EST. 1893 · DURHAM, NORTH CAROLINA
SUBSIDIARY OF THE SPERRY CORPORATION



Nothing takes the place of Glycerine

Because—Glycerine is a wholesome humectant . . . retaining freshness, improving texture in cakes and breads . . . avoiding graining in icings, toppings, marshmallow fillings . . . preventing hardening in jams, jellies, candies, chewing gums.

Because—Glycerine is a food . . . digesting normally to supply energy in much the same way as sugars and fats.

Because—Glycerine is a solvent and blending agent . . . improving the palatability, sharpening the distinctive tastes of flavoring preparations. Glycerine is a sweetening agent, a preservative. Its well-proved versatility can be matched by no other product.

That's why in the food industry—and in *all* industry—for today's products—and for tomorrow's—*Nothing takes the place of glycerine!*

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue
NEW YORK 17, NEW YORK

Technical GLYCERINE NEWS

COMPRESSED FOODS THAT ARE FRIABLE. Major problem of compressed food manufacturers is friability. One answer is the use of a small quantity of glycerine prior to compression. The glycerine is said to produce a firm product which can be easily broken when ready for use. (F-1)

★ ★ ★

A NON-TOXIC REFRIGERANT. A refrigerant mixture, particularly suited for use with foodstuffs because it has no objectionable taste and is edible, may be prepared from glycerine and water. (F-2)

★ ★ ★

NEW SUBSTITUTE FOR CORKS. Closures for foodstuffs may soon be made with a new cork substitute in which glycerine is an essential ingredient. The new product is claimed to have bulk density and resilience comparable to natural cork. (F-3)

★ ★ ★

GLYCEROL VISCOSITIES TABLE AVAILABLE. Miner Laboratories, headquarters for the Glycerine Producers' Association program of glycerine research, has prepared a table of viscosities of glycerol in aqueous solution from 0 to 100 per cent, at from 0 to 100 degrees C. You can obtain your copy by checking item F-4 on the coupon below. (F-4)

★ ★ ★

SECRET OF NEW QUICK-METHOD CAKES. The potent ingredient in the new quick-method cakes is a shortening containing a glycerine compound. This shortening makes possible the use of more sugar and milk to improve the cake. (F-5)

★ ★ ★

PLANT SAFETY HINT. If your workers use safety goggles, glycerine is a must. It's one of the best anti-fogging agents—and it's a good lens cleaner, too. (F-6)

GLYCERINE PRODUCERS' ASSOCIATION, DEPT. 8
295 MADISON AVENUE
NEW YORK 17, N. Y.

I should like to receive more information on the source of the items appearing in Technical Glycerine News. I have checked below those items which interest me.

☐ F-1 ☐ F-2 ☐ F-3 ☐ F-4 ☐ F-5 ☐ F-6

NAME .....

COMPANY .....

ADDRESS .....

VACUUM SEAL JUICES AND SYRUPS UP TO 200 PER MINUTE WITH

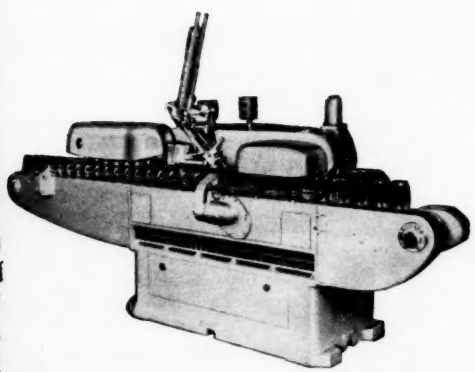
Anchorvac* N Caps

THE *Anchorvac* N Cap is the ideal closure for juices of all types, vinegars, syrups and wines which are hot-packed with or without pasteurization. Its dependable high vacuum seal and high blow-off features combine to give fullest protection at low cost for these products.

Nested for stack feeding, *Anchorvac* N Caps can be applied in a straight-line operation with the *Anchor Steriseal** Machine at speeds ranging from 75 to 200 per minute. In housewives' hands the cap is easily removed and when pressed back on forms a fully hermetic reseal.

Write us for more information and samples for test purposes.

*Trade-Mark



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

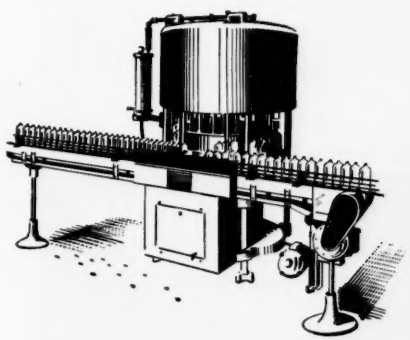
FILLING IS FAST AND ACCURATE in Uniform Anchorglass*

HIGH speed filling requires uniform containers . . . containers that are uniform in height, in neck and body diameter, in capacity, in finish.

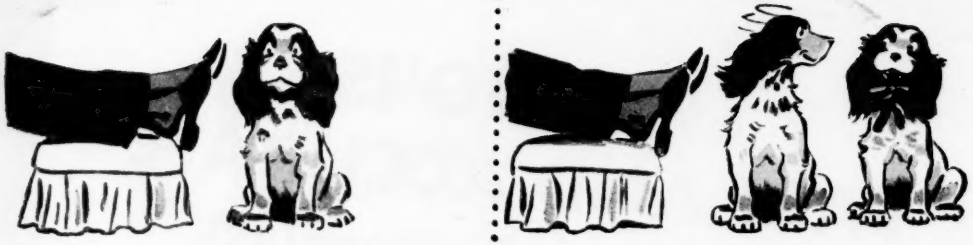
Consistency in manufacture, even distribution of glass, accurate temperature control in annealing, quality control through laboratory tests and regular inspections in every plant make and keep *Anchorglass* containers uniform . . . keep them going through your filling and other operations in clock-like fashion.

Sparkling *Anchorglass* containers are supplied in all standard styles, capacities and finishes, in crystal, amber or emerald green glass. Samples for test or comparative purposes gladly supplied on request.

*Reg. U. S. Pat. Off.



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio



For just a little extra

You can get a lot more

W&D 3171

Allegheny Metal yields benefits that repay you many times over in lifetime beauty and utility. Wherever you need to combat corrosion and heat, or secure great strength with light weight, use this time-tested stainless steel. It vastly increases service life—vastly reduces maintenance and depreciation costs. • Compared on all counts, Allegheny Metal is *cheapest* in the long run!

Complete technical and fabricating data—engineering help, too—yours for the asking.

ALLEGHENY LUDLUM STEEL CORPORATION

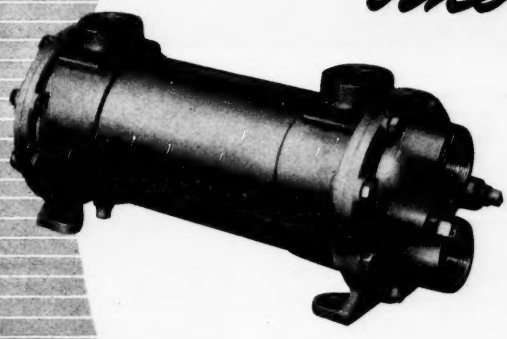
The Nation's Leading Producer of Stainless Steel in All Forms

Pittsburgh, Penna. . . . Offices in Principal Cities

Allegheny Metal is stocked by all Jos. T. Ryerson & Son, Inc., Warehouses

You'll transfer more BTU's per dollar invested...

...than with any other exchanger



● Embodying highest standards of construction, longer-lasting nonferrous materials and latest developments in thermal engineering, the fully standardized Ross "BCF" Exchangers offer industry a new low cost for high heat transfer efficiency.

Oil and water cooling, water and process heating or vapor condensing requirements can now be met by units carried in stock as shelf goods at the Ross plant. The needs of *most* have been interpreted and placed into mass production. Low unit costs, which mean more BTU's transferred per dollar, await chemical, process, hydraulic machinery, Diesel, food, petroleum, paper, power, textile, metal and a host of other industries.

This coupon, filled in and mailed, will bring the complete "BCF" story to your desk.

ROSS

"BCF" EXCHANGER

Ross Heater & Mfg. Co., Inc.
1443 West Ave., Buffalo 13, N. Y.

Please send FREE your new Bulletin 1.1K1

Name _____

Title _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

Division of American Radiator & Standard Sanitary Corporation **ROSS HEATER & MFG. CO., INC.** Represented in Canada by Horton Steel Works, Ltd., Fort Erie, Ontario

Serving home and industry

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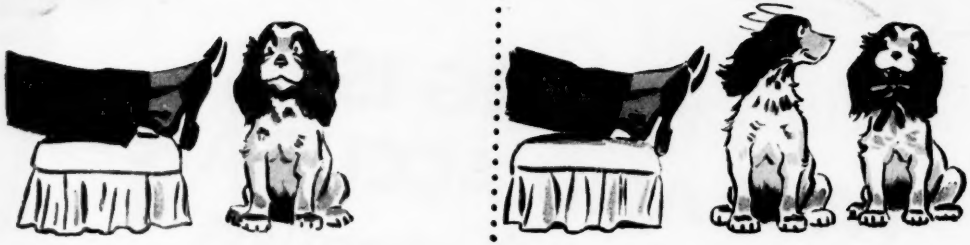

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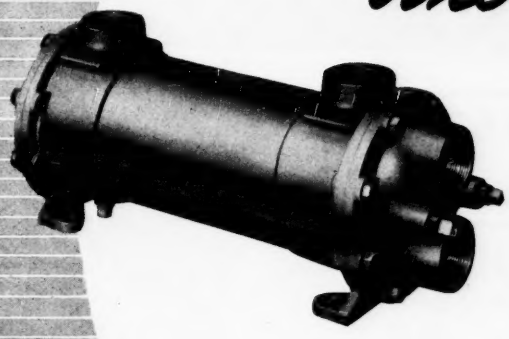

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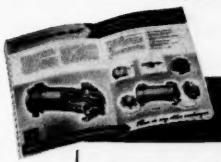

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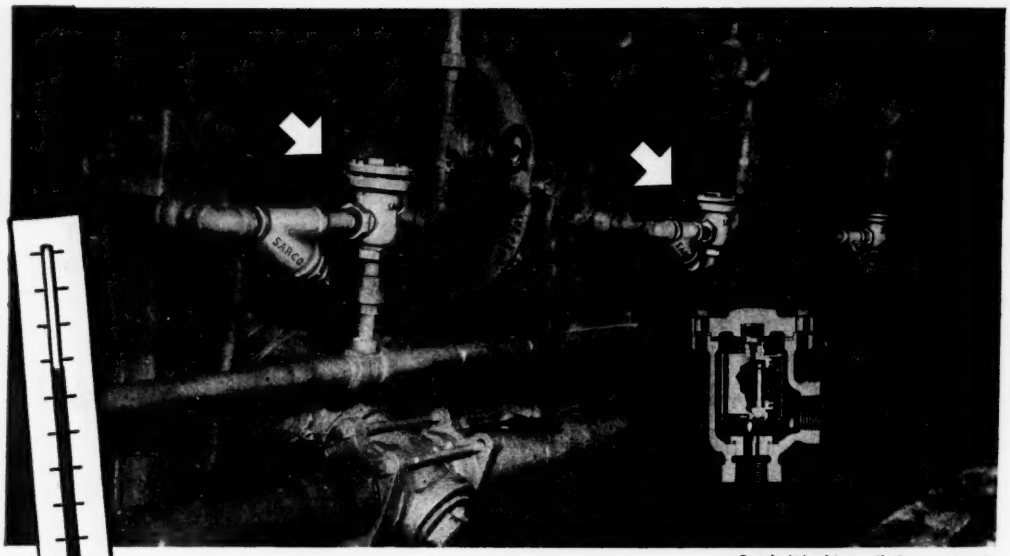

Bottle Washing wih Sarco No. 9s

TEMPERATURES TALK $$$ DOLLARS $$$

Heat is big money in the food and process industries. Waste cannot be allowed. And too much or too little heat can spoil an expensive batch of material or slow down the entire plant.

At each stage, soaking, washing and rinsing, heat must be correctly applied to produce clean bottles, without breakage. And for maximum production, the traps must first purge the coils of all air quickly, so that the steam can follow. Then, condensate must be removed without steam waste.

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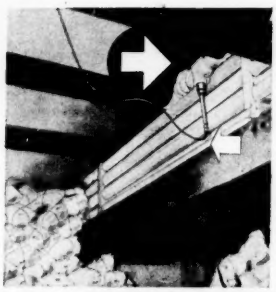
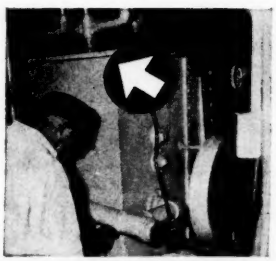
In addition, there are a dozen Sarco heating and cooling controls. The correct combination of trapping and control that will make temperatures right in your plant can be suggested by the Sarco Representative near you.



KR-14 Control on ham storage box



TR-21 Temperature Control on can cooler

236

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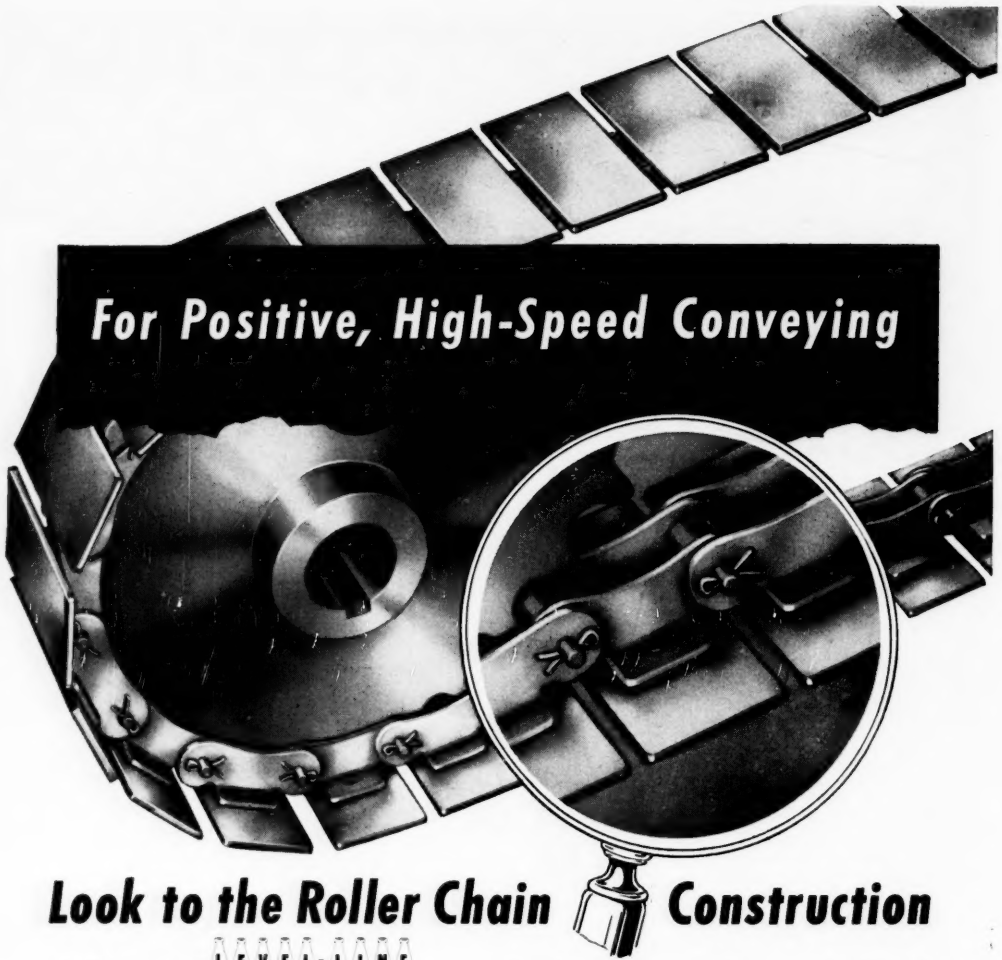

Look to the Roller Chain Construction

Whitney LEVEL-LINE Conveyor Chain Drives Assure Smooth Transfer of Materials

Regardless of your equipment — be it washer, filler, labeler, capper, wrapper — Whitney Platform Conveyor Chain assures smooth travel for bottles, cans or cartons.

The all-steel roller chain construction absorbs shock... provides uniform delivery and discharge. Deeply seated in cut tooth drive sprockets, it provides positive high speed conveying over any distance without chattering or jamming. Top plates remain level for sure transfer of goods from one conveyor to another. The smooth surfaces of the plates are easy to clean and keep sanitary. Tapered head pins make chain assembly or disassembly quick and easy. The sturdy construction throughout assures long operating life and minimum maintenance.

Keep your equipment delivering smoothly and steadily—use Whitney Platform Conveyor Chain. Remember, too, Whitney Roller Chain, Silent Chain and Cut Tooth Sprockets will help you keep production going wherever dependable power transmission is required. It pays to Standardize on Whitney. Write for information.

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Division of Whitney-Hanson Industries, Inc.
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CONVEYOR CHAIN

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moisture protection
transparency
sales appeal **100%**
grease protection
strength

Whatever your specialty there is a Sylvania Cellophane that offers just the combination of properties you need for successful packaging.

Because they are truly transparent, they give you the extra visibility that means sales appeal. They resist grease . . . keep your product free from contamination. Their uniform strength and heat sealing qualities make them easy to apply either by hand or automatic equipment.

Talk over your packaging problems with the Sylvania representative. He'll be glad to help you determine the combination of properties needed for your products. Or write to Market Development, Dept. F-4, for information, mentioning the specific application in which you are interested. You'll find us most cooperative.

Visit the AMA National Packaging Exposition—Atlantic City Auditorium—May 10th to 13th.

Attractively printed Sylvania Cellophane Type MS bag provides a mouth watering display for potato chips . . . puts your brand name where it will be remembered . . . builds repeat sales.

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SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

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Check your truck's heavy winter wear here...

It's been a wearing winter—

Maybe a spring leaf snapped during that severe cold snap. That could cause excessive tire wear, misalignment of axles. Or front-end parts may be sprung; that's bad for steering. Brakes may be worn; that's bad for stopping.

But . . . International's specialized spring service is *good* for what ails trucks.

It's been hard under the hood—

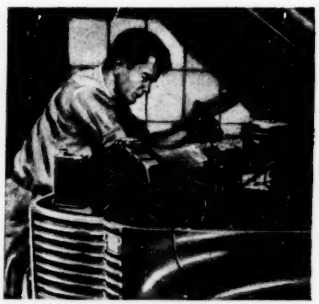
What winter weather took out of your engine, we can put back in!

We change oil, inspect, clean, adjust or replace spark plugs, distributor, voltage regulator, carburetor, valves, battery cables, and wiring.

All work is done by International factory-trained mechanics using special equipment.

It's been a tough grind. Here, there and—

Everywhere a truck needs lubrication, it needs lubrication now. So International service experts cover all chassis points, transmission, universal joints, differential, steering gear, wheel bearings, and any other spot that's too dry for its own good. And believe us, they do the job *right!*



It's time to get winter out of your systems—

We'll drain and flush the entire cooling system; refill, adding rust inhibitor, check water pump and cooling connections, check gaskets, hoses, connections and thermostat.

That's how International puts more spring in your truck's systems!

It's overhauling time—for trucks that have been hauling overtime—

4,700 International Dealers, and 170 Company-owned Branches and Service Stations offer you the nation's largest exclusive truck service organization. They're ready with specialized tools and service experience, ready with precision-engineered parts, ready with factory-rebuilt exchange units . . . ready to keep your trucks rolling profitably into spring and summer.

Have your trucks serviced *now* and save money and trouble later!

Other International Harvester Products
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Tune in James Melton and "Harvest of Stars" NBC, Sunday afternoons

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SIMPSON *Intensive* MIXERS

...a better, faster solution to difficult

SPICE BLENDING

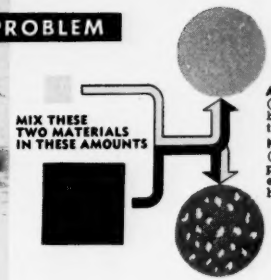
PROBLEM
MIX THESE TWO MATERIALS IN THESE AMOUNTS
AND GET THIS (Thoroughly blended, even texture)
NOT THIS (Not completely blended, "balling" has occurred)

Diagram shows how a minute proportion of one material is thoroughly blended with a large amount of another in a Simpson Intensive Mixer (top circle) as compared to ordinary mixing methods (bottom circle).

A large midwest spice manufacturer had difficulty in uniformly mixing and blending a proportionately small amount of Cream of Spice into a carrier. The seasoning was not thoroughly dispersed in the carrier in the first mixing operation in a ribbon type mixer, and a time-consuming grinder operation was necessary to complete the dispersion. A Simpson Intensive Mixer was installed and, in a single operation, thorough, more rapid blending was accomplished.

Simpson Intensive Mixers are being used in a wide variety of food processing applications, in capacities from ⅓ to 50 cu. ft. Let a National Engineer show you how these versatile mixers can cut costs and improve quality.

THE MULLING PRINCIPLE OF MIXING

The unique "mulling action" of a Simpson Intensive Mixer is comparable to the rubbing, kneading and smearing action of a mortar and pestle. This kind of mixing action eliminates any "balling" of materials and quickly effects a thorough dispersion of the elements in the mix. The result is a finished product of uniform quality. Because of the positive control obtained throughout this process, it is known as "Controlled Mixing."

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NATIONAL *Engineering Company*

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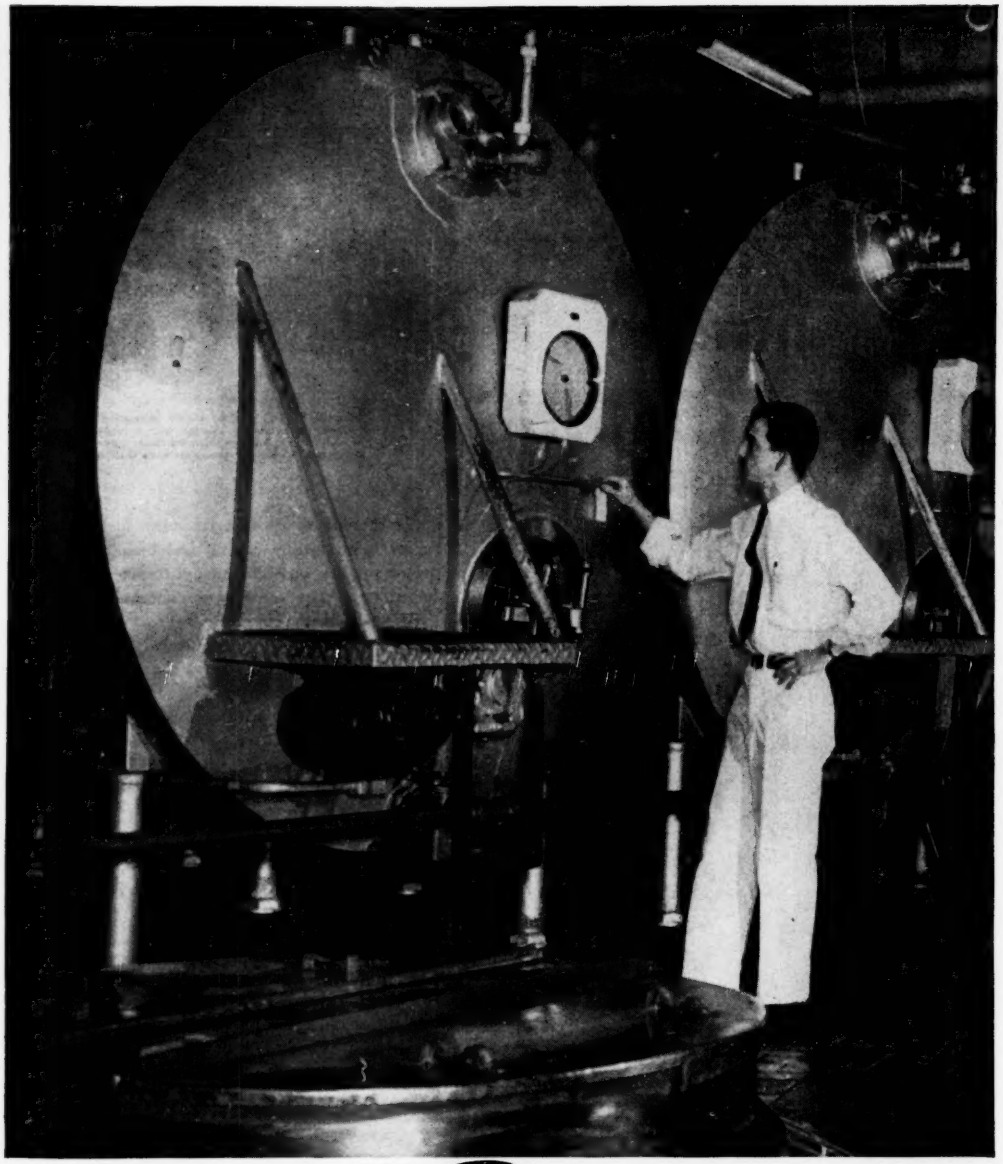

Enduro

REG. U. S. PAT. OFF.

REPUBLIC STEEL

REG. U. S. PAT. OFF.

STAINLESS STEEL HOLDING TANKS in this large midwestern ice cream plant protect product quality . . . are easy to keep sparkling and sanitary . . . require little or no maintenance. They are typical of countless cost-saving ENDURO applications throughout the dairy and food industries. Other applications include tanks, kettles, vats, hoppers, piping, valves, fittings—practically all types of processing and packaging equipment which come in contact with foods and food products.

Enduro-THRIFTY METAL OF 10,000 USES

EASY TO CLEAN... AND EASY TO KEEP CLEAN!

Gleaming, sanitary Republic ENDURO Stainless Steel is a material of many advantages—for many uses. High among the reasons for its universal adoption is its inherent cleanliness. This makes it easy to clean and easy to keep clean.

With ENDURO equipment, ordinary soap and water usually are all that's needed to restore its bright, non-contaminating surfaces. Under normal conditions, strong caustic agents and special scrubbing compounds are unnecessary to remove every trace of food oils or acids. Clean-up time—*costly non-productive time*—is cut to a minimum.

Check each of the 10 ENDURO advantages listed below. You'll quickly see why you save money in the long run by specifying ENDURO Stainless Steel on your new equipment orders. For detailed information, specifically related to your own operations, write us today.

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✓ **Check ALL 10 Advantages:** • RUST AND CORROSION-RESISTANCE • HEAT-RESISTANCE • HIGH STRENGTH • EYE APPEAL • NO METALLIC CONTAMINATION • SANITARY SURFACES • EASY TO CLEAN • EASY TO FABRICATE • LONG LIFE • LOW END COST

VODOL-XX is the exclusive product of Refining Unincorporated

GOLDEN BROWN
Naturally
Free-flowing!

VODOL-XX

Famed throughout the industries as the

CORN-OIL LECITHIN

(BONE-DRY)

IN THEIR OWN PRODUCTS—in continuous use of VODOL-XX over long periods—representative food industries have proved its unequalled advantages to their complete satisfaction. Pure virgin corn oil provides nature's finest lecithin! Processing by Refining Unincorporated has brought its incomparable qualities to perfection.

THE BONE-DRY CHARACTERISTIC OF VODOL-XX positively prevents any moisture disturbance. (Important to the chocolate manufacturer.)

Free-flowing VODOL-XX also means

- No pre-heating, pre-dissolving, straining nor thinning
- Instant solubility at low temperatures
- Ready dispersion in fats
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Join the others who have found VODOL-XX the most satisfactory on all counts in

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Without obligation, I'll be glad to give VODOL-XX a trial in our plant.

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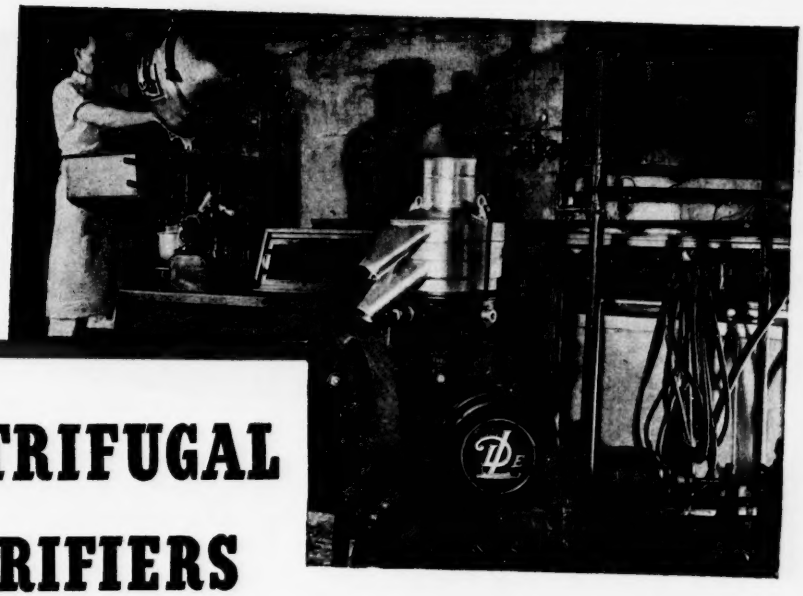

CENTRIFUGAL CLARIFIERS

save $110 per week!

DE LAVAL Multiple Clarifiers save a famous California doughnut maker $110 per week. Small particles of doughnut get into the deep fat frying oil, and, if not removed, get burned to a crisp in the hot oil. Such burned particles, in a week's time, would change cooking oil from clear yellow to black. Moreover—and most important—the oil would become rancid after a time. De Laval Multiple Clarifiers make it possible to use the cooking oil indefinitely by making it so clean it can be added directly to the make-up oil.

This is another specific instance of how De Laval centrifugal machines can save money by effecting continuous separation. This particular clarification is fairly simple, but often the application is for a more difficult type of separation. In all such cases, a wide range of types and sizes of De Laval machines is available to help you do the job quicker . . . more completely . . . ***continuously.***

Write for Bulletin IC-1.

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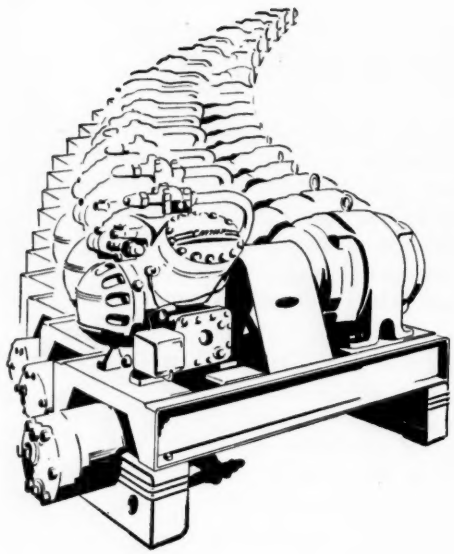
De Laval Centrifugal Machines

FOR PROCESSING SYSTEMS

More than 1000 Customized Combinations with Carrier Refrigeration



TOO MUCH refrigeration is a waste of money—so is too little. You have definite freezing, cooling and storing requirements in your food plant—and the most economical refrigeration is one which exactly meets your needs.

With Carrier Customized Compressors you get your choice of more than 1000 different combinations—condensers, drives and motors—to meet every food plant need from 5 to 100 hp. All these components are customized—that is, tailored to fit each other. The installation, quickly and easily assembled on the job, exactly meets your requirements. As a result, you get the most economical refrigeration for your plant.

Not only that, Carrier Customized Compressors are sturdily built from selected materials for years of hard, dependable service. Forced-feed lubrication to all bearings reduces wear. Automatic load-free starting means effortless starts without special motors. Replaceable cylinder sleeves simplify service. And exclusive vapor-cushioned, non-flexing valves assure quiet operation, long life.

Carrier Customized Refrigeration also gives you the extra values of unrivaled engineering know-how and experience. Write today for Catalog 5FH1. Carrier Corporation, Syracuse, N. Y.

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DO YOUR PRODUCTS NEED MORE FLAVORING *oomph?*

ARE one or two of your flavored items disappointing in flavor appeal? . . . are they a trifle weak or unexciting? If so, our ever-popular imitation FRITZBRO AROMES may have just what your product needs to give it more flavoring *oomph* . . . more life, more zest, more concentrated appeal.

FRITZBRO AROMES IMITATION are concentrated fruit extractives skillfully combined with complex fortifying agents to produce a livelier, more palatable flavoring effect.

FRITZBRO AROMES IMITATION are ideal for use by the confectioner in cream centers, cordial goods and pectin jellies; by the manufacturer of extracts and fountain syrups; and by food and dessert manufacturers for pectin jelly and gelatin dessert powders.

Refer to the accompanying list of flavors, then, without obligating yourself, fill in and return the coupon for desired samples. We want you to know about these very popular, very economical flavors.

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for use in: ..... *(Indicate Type of Goods)*

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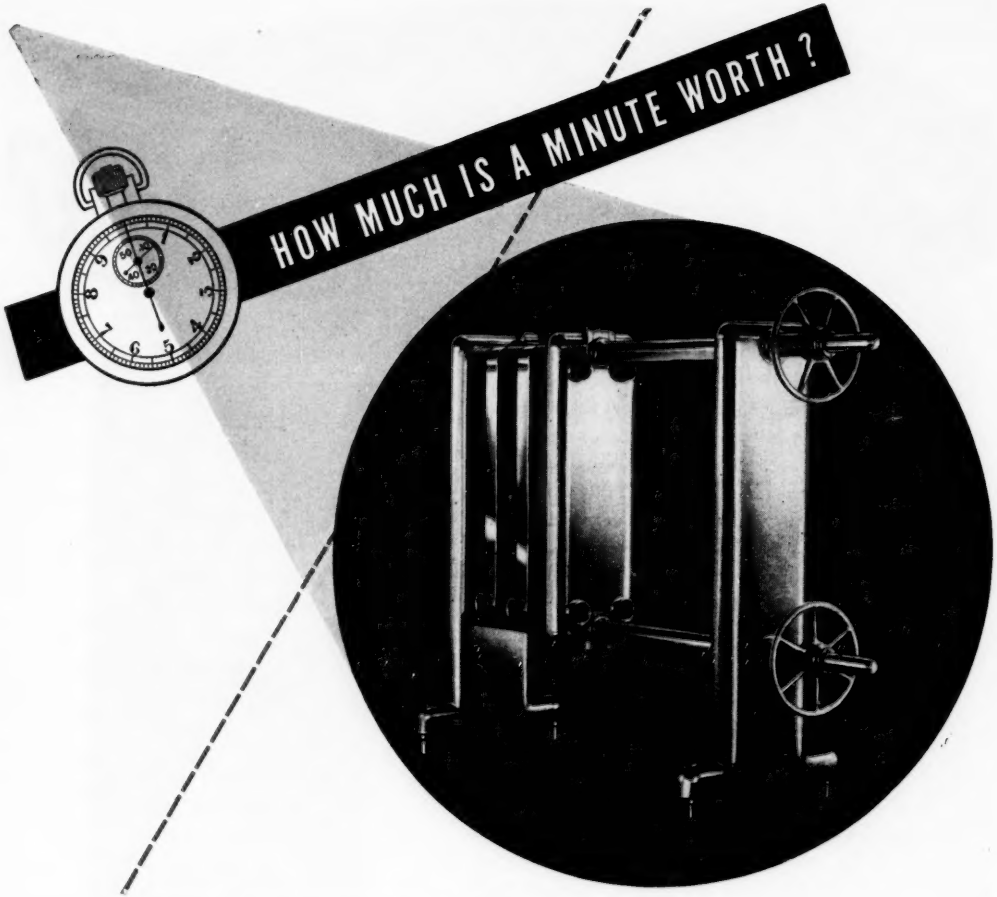

Processing time is measured in dollars and cents. Superplate can save the minutes that mean dollars for you. That's why more and more food plant operators are turning to continuous processing systems in plate-type equipment for heating, cooling and pasteurizing. Cherry-Burrell's Superplate is widely considered the finest in the field.

Here's a fully sanitary unit that offers unequalled savings in not only time, but also in steam, refrigeration, water, labor, and maintenance costs. Further savings come through Superplate's versatility in doing the work of several machines—heating, cooling and pasteurizing within the same frame simultaneously . . . and with such a wide variety of liquid foods as milk, cream, fruit or vegetable juices, wine, etc. This flexibility extends to capacity too, which can be easily expanded.

These advantages and savings are combined into a minimum of floor space — and with assurance of uniformly superior products. These are advantages you can't afford to overlook . . . advantages you'll want to hear about more completely from your Cherry-Burrell representative.

KNOBS MAKE THE DIFFERENCE!

Here's the secret of Superplate's efficient, uniform heat transfer—knob type stainless steel plates. They're just one more of Superplate's many exclusive patented advantages for you.

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trendmaker in a great industry

The Election of November 2, 1948 GAVE NO MANDATE FOR SOCIALISM

The President and those who support his legislative program have objected to the substance of my previous editorial, which appeared under this headline: "Now is the Time to FIGHT SOCIALISM in Washington."

In that editorial I explained how Washington is poised to follow the disastrous policy of forcing industry to skimp on new plants and new equipment. That policy landed Britain in the numbing embrace of the Socialists. I cited the experience of Britain to show how such skimping on industrial tools can bring a nation to economic stagnation . . . and Socialism.

The President, in his recent Jackson Day speech, brushed aside this warning . . . "They are again trying to frighten the people with the old worn-out bugaboo that Socialism is taking over in Washington." Senator Francis J. Myers of Pennsylvania asserted that I was guilty of "warfare against any reasonable effort to keep our system of free enterprise working."

These criticisms may be sincere. But they are not well-founded.

I want to show why they are not well-founded by basing this editorial on Washington rather than Britain.

In Washington the Administration has proposed a legislative program, the key parts of which would clearly put the country far on the road to Socialism. Let us see how.

There are two steps in the process:

FIRST: The government by its taxation program undermines private industry so that it cannot provide itself with the necessary new plant and tools.

SECOND: The government itself steps in to provide the plants and equipment that it has blocked industry from getting. *That is Socialism.*

Here is how Washington is promoting Socialization of the steel industry—and of other industries.

Steel has been expanding its capacity and improving its equipment chiefly by plowing back its profits. During the last three years it has spent $1.4 billion for new plants and new tools. That was more than the companies had available from their own earnings. But profits provided more

continued on next page

than half of that money—more than $700 million. The remainder came from loans and from depreciation reserves set aside out of the earnings to replace worn-out equipment.

Profits must continue to provide the funds needed to pay for the bulk of the steel industry's necessary expansion. That is because private citizens, their income slashed by heavy taxes, have not been willing to buy steel stocks even at prices ruinously low for the companies and their present stockholders. The stock market currently prices the mills and other facilities of the nation's principal steel-producing companies at far less than fifty percent of the cost of reproducing them.

Let us take another example. Profits are essential to expansion in the electric light and power industry also. This year private companies are planning to buy $2 billion worth of new plant and equipment. To do that without going overboard in debt, they must sell to the public some $300 million worth of common stock. A squeeze on their profits would make that sale virtually impossible.

For tens of thousands of small business enterprises profits afford virtually the only practical source of funds for new equipment and expansion.

In the face of these and many other examples that might be cited, what is the most effective way to prevent industry from re-equipping itself and expanding is capacity to meet our essential needs?

Obviously, it is to cut down profits. And that is what the Administration is trying to do. The President has declared that steel prices are too high, and is demanding that Congress raise taxes sharply on all corporations.

There you have the first step toward socializing industry.

Next comes step two. Have the government supply the tools and equipment which, by taxation, it prevents industry from getting.

The Administration has proposed legislation to carry out this second step. It is called the "Economic Stability Act of 1949," for short, the "Spence Bill."

This bill gives the President the power to provide industrial facilities—in steel, power or any other industry—where he finds that a shortage is hampering or is likely to hamper the economy.

True, the bill says that the government is not to construct new plants if private companies will do it through government loans, on terms prescribed by the President. That may be just one step short of complete socialization. But it is only a short step. And the Spence Bill authorizes the government to take that step.

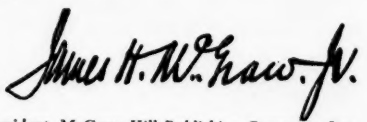
By itself, the Administration's "Stability Act" sounds harmless enough. It would have the government build plants only as a last resort. But it provides also that if private enterprise cannot turn out all the goods the country needs, the government can and should step in and provide the equipment to do it.

Now, take that power together with an Administration tax program that undercuts the ability of private enterprise to supply the new plants and equipment it needs out of its own earnings. That combination promotes government ownership and operation of industry.

And that is Socialism.

The American people, of course, have the right to live under any system they choose—Capitalism, Socialism, Fascism, Communism, or what-have-you. But before Socialism or any other "ism" is imposed upon us from above, the people should know the facts. If this editorial shall have contributed in some small degree to that end it will have served its purpose.

The election of November 2, 1948 gave no mandate for Socialism.



President, McGraw-Hill Publishing Company, Inc.

Food Industries

Role of Food Industry in World-Development Plan

It has become apparent that President Truman's "bold new program" for improving the underdeveloped areas of the world was no mere gesture. The Administration will try to carry it through.

The idea is to make available to these areas the technological knowledge of the advanced Western countries. Among the expected benefits are: (1) Alleviation of hunger and improvement in health in those areas. (2) Industrial development which will raise the standards of living and provide buying power to create new world markets. (3) Blocking of Communism by removing the unhappy conditions on which it thrives. (4) Promotion of world peace. (5) Avoidance of further relief.

Exactly what means will be employed to carry out this significant program is not yet known. But present plans are to utilize all existing agencies of the United Nations. Technical aid will be provided by the U. S., in cooperation with other countries, when U.N. agencies are unable to act. And last, but perhaps most important of all, private agencies of all types will be utilized.

It is hoped that business men will do a major part of the job by investing capital in new and needed enterprises in those areas. They are not expected to do this at great risk or without a return. Which means that their investments probably will be underwritten to an important extent by the Federal government.

Now where does food processing come into this picture? Well, the FAO estimates that by 1960 the world will need about two-and-two-thirds times as many fruits and vegetables as produced in 1935-39. It will need twice as much milk, about half again as much meat, and about a fifth more cereals. And with FAO technical aid, it is hoped that something like these increases will be achieved.

But what good will come from producing more of these commodities if the facilities are not there to preserve them or convert them into consumable foods? Agricultural development must be accompanied by the installation of processing facilities, which in turn calls for the technical know-how of our industry.

The first step in transplanting progress to an underdeveloped area will be to send a technical task force to that area to survey needs and possibilities. Certainly one or more experts on food processing — and we mean experts — should be included in that group. If so, certain American food processors might be asked for temporary "loan" of one of their technologists or engineers. We believe the issues at stake make this desirable.

If this program gets going, there may be several visitors from abroad who will want to see American food plants in operation. Perhaps some will want to work in them for experience. We believe that food companies should help them.

Food technologists may be asked to advise the agencies taking part in the program, and that doesn't seem too much to ask, either.

So far it looks like a one-way deal, with American food processors on the short end. But food firms may find new opportunities for operation abroad as the program unfolds. Certainly they ought to gain needed new export markets as the areas develop industrially over the years.

But will the increase in food processing in these underdeveloped areas result in exports to the U. S. which will take business away from American food companies? Will cheap labor abroad enable foreign processors to undersell U. S. firms?

In a broad sense, the answer to both questions is "no," although there probably will be some exceptions. In the first place, the underdeveloped areas cannot possibly attain efficiency and quality comparable to that in the U. S. on a limited amount of "borrowed" know-how. To do that would require facilities and trained and experienced personnel on the same scale as we have them. Anyway, we could tell them everything we know, and still be years ahead of them by the time they put it into large-scale practice.

The program for improving the underdeveloped areas has tremendous possibilities, with small cost to American taxpayers. Hope for future peace and prosperity may hang on this thread.

—F. K. LAWLER, *Editor*

The Talk of the Industry

Tax Knocks Bottom Out of Business

If there is any doubt as to the detrimental effect of unwise sales taxes on low-cost food products, those doubts should be removed by the sad experience of the soft drink industry in Pennsylvania.

During the first year of the 20 percent tax, the bottlers' sales dropped to 54 percent of the previous year, then went down another 4 percent in the next 12-month period. By comparison, soft drink sales for the country as a whole were up 23 and 42 percent, respectively, for the two years.

Employment in the industry dropped 25 percent as a result of decreased sales. So legislators, both state and federal, better beware lest they tax business into a first-class depression.

Taxes Hit Where It Hurts

Current high rates of taxation, regardless of their merits, have so dried up the sources of risk capital—once irreverently known as "sucker money"—that it is more expedient for smaller concerns to sell out to bigger ones than it is to acquire capital for expansion. Thus does the leftist trend encourage the big to get bigger. Witness the sale of Rumford Chemical Works to Heyden Chemical Co., E. Hurff & Son to California Packing Corp., and E. Pritchard & Co. to Hunt Foods Corp.

Going Down Is Risky Business

Declining commodity and food prices have been welcomed by food processor and consumer alike. But in a downward trend of this type, management must really *manage*, if satisfactory profits are to be maintained. As Armour's George A. Eastwood puts it for his industry: "Price levels are not the determining factor in profits, but because of the small margins on which the meat industry operates, it is difficult to earn money when prices are declining."

Margins being small in most lines of food processing, you will agree that Mr. Eastwood said a mouthful.

New Bill Has King-Size Joker

Senator Magnuson recently introduced a bill (S. 856) ostensibly designed to aid the fisheries industry. It would establish a Fisheries Stabilization Corp. to extend loans up to $75 million. And it would permit government support of fish prices.

Those provisions alone would put the foot of bureaucracy inside the door of another private business. But there is still more. Section 4(15) would permit the government to "package, process, manufacture, can, freeze, store and transport any fish products acquired by it or required by any other agency in the United States."

It certainly looks as though the Senator means to help the fisheries industry—help it right out of private business.

Degassed Eggs Can Be Frozen in Shell

One thing has a habit of leading to another, especially in the field of technological development. So it is not too surprising that experiments in freezing mushrooms, carried out in England 12 years ago, have led to a new method of preserving shell eggs.

Dr. S. A. Kaloyereas, now of Louisiana State University, did the work on mushrooms. And he concluded that these fragile "vegetables" might be kept intact during freezing if some of the water were removed to make room for the remainder to expand as it turned to ice. This led to dehydrofreezing, and now Dr. Kaloyereas finds that eggs can be frozen without cracking the shell if 2 or 3 percent of the water is removed under a vacuum. The dehydration lowers the freezing point of the white, so that the yolk freezes first at 20 deg. F. and pushes the white toward the shell to fill the airspace. Quality of the egg is not impaired. On the contrary, the whites are more whippable.

But we hope we never get hit by a frozen egg.

Now Comes 2-Second Sterilization

Continuous sterilizers for fluid foods other than milk are now being operated at temperatures so high that practically no holding time is required. The product is heated from 100 to 240 deg. F. in about 2 seconds, and then is cooled almost instantaneously under vacuum. Obviously, production capacity is increased and time and plant floor space saved.

Naturally, these short-high sterilizers require pretty sensitive automatic control. And there now are available thermo-limit controllers which respond to 1 deg. per second temperature variation.

It's nice to see food technology march forward on the double-quick.

Hors d'Oeuvres

■ Can Manufacturers Institute reports that an ordinary can dumped into the Atlantic off Florida was found four months later on the northwest coast of Scotland. Granted that transportation costs might be getting out of hand, this bit of research still seems to be a little ahead of its time.

■ Army flyers used "skip bombing" in dropping hay alongside snow stranded cattle. Bet a lot of ranchers and cattle are glad the flyers didn't go in for their "pin point" technic.

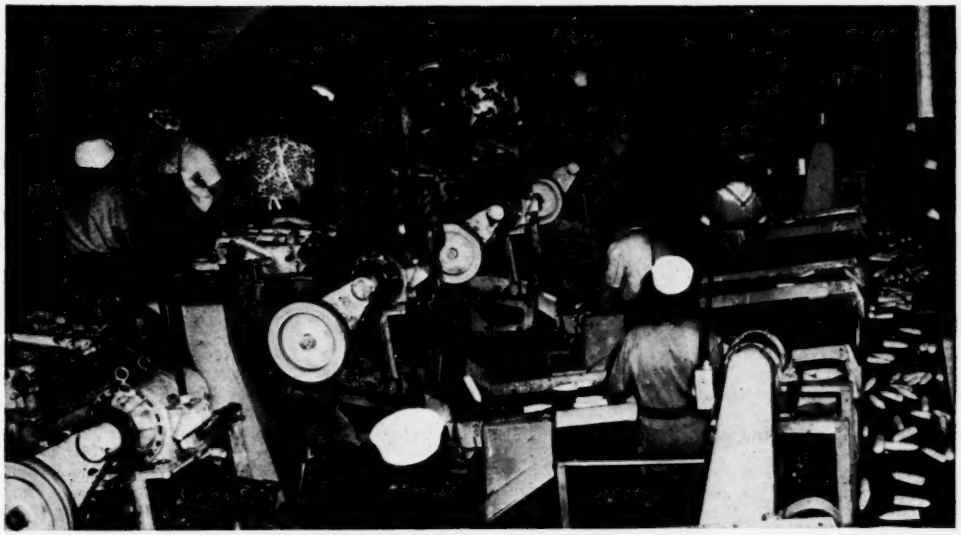
■ The most musical of ocean creatures is the toadfish, according to Dr. Martin W. Johnson, Scripps Institute of Oceanography of California. It utters a pigeon-like cooing, he said. This gives you a rough idea of what to expect from the lesser gifted ocean inhabitants.

■ Restaurants in New York are taking on a potato peeling and slicing service, established by four ex-GI's. And the service may cater right to the housewife later on. Someone here must have done just enough KP duty to learn that people will pay to avoid it.

■ Keeping tabs on hens is cheaper and more accurate, says the magazine *Electronics*, when a wire recorder is used. Number and day's production of each hen is dictated by farm hand as he gathers the eggs. Later, recorder is taken to office, where data is compiled. Makes boondoggling in the hen house more hazardous than ever.

■ Slow month, April. All we can offer at this writing is *Honey for Breakfast Week*, April 17 to 23, and *Donut Week*, April 25 to 30.

J.A.J.J.



IN CORN PACK (above), 82 percent of plant labor participated under company incentive plan—in pea pack 87 percent.

Seasonal Industry Profits From Production Engineering

Minnesota Valley gears system to pre-pack, pack, and off-season conditions—and thereby ups production, cuts costs, and raises employee earnings

DR. G. C. SCOTT
Vice-President in Charge of Production & Research, Minnesota Valley Canning Co., Le Sueur, Minn., and

CARL H. ZAMZOW, JR.
Account Manager, George Fry & Associates, Chicago and New York

Until recently, Minnesota Valley Canning Co. was faced with the major problem confronting most companies today—rising labor costs with little or no corresponding increase in worker productivity.

The problem is well known. The output of the average worker has failed to keep pace with the decided increase in wage levels. And now competitive conditions and the emergence of a buyers' market, coupled with rising labor costs, are creating even greater difficulties.

This problem was even more of an obstacle for Minnesota Valley than for most companies—for the simple reason that our work, canning, is performed on a seasonal basis. More specifically, the problem is intensified by these complicating factors—

1. Our production is accomplished during a period of aproximately 60 days, or about 17 percent of the year.

2. Our raw materials are perishable and we cannot "stockpile"—we must prepare and process our products immediately when they are ready.

3. Variations in the quantity and quality of raw materials from day to day are extreme and unpredictable.

4. Our plants are located in small communities of about 2,000 people. This limits our labor market.

5. Since the bulk of our employees are seasonal workers, the total payroll varies from 15,000 employees in the middle of the packing season to about 1,000 during the off-season or winter months.

6. Our employees are made up of all types of workers—including housewives, retired farmers, school children, "foreign" labor and inmates of institutions—with only a few good all-year-'round employees to guide them.

With these factors as a background, our company chose a different tack from that of most companies in meeting the problem at hand.

Despite rising labor costs, our company chose neither to increase the sales price of the products nor to cut the margin of profit. Instead, it worked on the assumption that its present costs could be maintained—through the massing of labor and management into an organized program, through the control of waste, and through the establishment and maintenance of fair and equitable work standards coupled with an incentive application.

By increasing production through an incentive plan, the same percent of unit-sales value will go to direct labor, but the percent of unit-sales value devoted to overhead in indirect labor expenses will be less—with a resulting increase in profit margin which will enable the company to raise base wages and give a larger return to the investor.

Thus, in the summer of 1946, a production engineering program was installed in our Minnesota Division. And by the end of 1947, certain definite results had been obtained which revealed the success of the program.

Output, Earnings Up; Unit Cost Down

In the analysis of these results, the year 1946 was used as normal, or 100 percent. Cases per labor hour (cases packed divided by hours of work required) showed an increase of 11.7 percent over the year 1946. This increase was due to a variety of factors, the main ones being better scheduling

of supplies and working time and a more even distribution of the work load among the employees.

The average hourly earnings of all production employees showed an increase of 15.5 percent. Aproximately 5 percent of this increase was due to a readjustment of base rates as a result of job evaluation. The remaining 10.5 percent of the 15.5 percent was due to earning of extra pay for extra work by means of the incentive application.

Average hourly production was increased 7.55 percent. This gain can and will be materially increased by improving scheduling and minimizing production delay time.

Man-hours worked per hour of plant operation showed a decrease of 12.6 percent—due to a better utilization of labor. And overall unit cost was decreased by 2.2 percent over the preceding year.

It must be remembered that these figures are based on the results of seven Minnesota plants. Notable increases were made in some plants, whereas in other plants, owing to factors beyond our control, the results were not so favorable.

Phases of the Program

This production engineering program was at first limited to the largest plant—one which packs peas and corn. The initial phases included the training of supervisors, analysis of working methods, possible improvements of standardization, the establishment of production standards, and a wage incentive application.

The results were such that the company decided the program should be broadened to cover all of its plants. This extended program, undertaken shortly after completion of the 1946 corn pack, included these four phases:

1. Establishment of a production engineering department and selection and proper training of suitable personnel to carry out the functions of this department.
2. A period of gathering basic data on which to set up such a program.
3. Establishment and presentation of a training program for supervisors and key employees.
4. A complete job-evaluation program to make certain all job rates were equitable.

Setting Up the P. E. Department

The production engineering department was established as a staff department under the assistant general superintendent, and the functions, responsibilities, and commensurate authorities were precisely defined. The specific functions were as follows:

1. Construction and upkeep of plant and equipment layout.

Program Paid Off By—

- **Increasing average hourly earnings 15.5 percent**
- **Increasing cases per labor-hour 11.7 percent**
- **Increasing average hourly production 7.55 percent**
- **Decreasing man-hours worked per hour of plant operation 12.6 percent**
- **Decreasing overall unit cost 2.2 percent**

2. Administration of a work-simplification and methods-standardization program.
3. Establishment of a perpetual training program, including supervisory, employee, and job training.
4. Preparation and upkeep of all job descriptions.
5. Setting of production standards by means of approved time-study technics.
6. Application of production standards in formulating wage incentives.
7. Establishment and upkeep of cost control reports.

After setting the basic organization structure, it was necessary to select the proper personnel to carry out these functions.

During the first few months of the program, we chose six men and trained them in the production engineering principles. They took a short, concentrated course, followed by practical training (actual field work) in the various operations.

Basic Data Gathered

First step by the production engineering department was the gathering of elemental data upon which to base the various steps. Not only was this essential for the program but it also provided a means of giving practical production engineering training to a group of new men.

Plant layout and process charts came first. Complete, up-to-date, and standardized plant and equipment layouts were drafted for the seven plants. Concurrently, process charts were prepared for both peas and corn.

To clarify the picture still further, flow charts were made showing the passage of products in process by means of flow lines superimposed on the plant and equipment layout. These charts now provide the men with a measure for studying and standardizing the working methods. They also acquaint the department personnel with the equipment and operations at the various plants.

Next step was preparation of job descriptions—to provide a basis for the job evaluation phase of the program and acquaint the new men with the knowledge of the various jobs performed. Each of the seven plants was visited, and the descriptions of the jobs were carefully made up in cooperation with the local management.

At this point, enough information was accumulated to provide a basis for the supervisory training program.

Training Supervisors and Key Workers

Minnesota Valley believes that production effectiveness hinges largely on the way its supervisors and key employees are trained. Too often, production effectiveness will backslide because top management neglects this vital function.

Our program, specially arranged to fit the needs of the company, was designed to equip the supervisors to handle all the responsibilities of front-line managements. To begin with, a series of 20 sessions was presented which covered the following wide range of topics:

Principles of Organization as Applied to Minnesota Valley Canning Co.
Planning the Supervisor's Job
Work Simplification and Methods Analysis
Plant Equipment and Layout
Inducting the New Employee
Principles and Application of Job Training
The Supervisor and Employee Morale
The Supervisor and Discipline
Techniques of Work Measurement
Setting Production Standards
Wage Administration and Job Evaluation
The Wage Incentive Program
The Supervisor and Good Labor Relations
Budgetary Control

This program was initially given to 25 members of the division management group, which included plant managers and their plant superintendents. The program was then taken to the company's seven Minnesota plants and presented to 124 key employees.

The training conferences were not lectures; they were discussion periods where employee participation was encouraged. The subject material presented was augmented by moving pictures, charts and graphs, demonstrations, and actual performance in procedures.

These illustrations and procedures highlighted our problems in the various plants and the methods that we ordinarily use to solve these problems. Each man participating was given a training manual, and as the program continued this was supplemented by more training literature.

We believe that this training has helped our supervisors to be more

efficient, better prepared for advancement within our organization, more informed on the company's organization policy and procedures, and more familiar with the services of our various staff departments and the best ways to benefit from these services.

Evaluation of Jobs

The job-evaluation phase of this program was, of course, undertaken with the main objective of establishing a sensible system of equitable, easily understood wage rates.

A point system was employed, and such elemental factors as the following were used in the evaluation: Physical demand, attention required, initiative and ingenuity, schooling or its equivalent, experience, working conditions, accident hazards, responsibility for machinery and equipment, responsibility for the safety of others, and leadership required.

The evaluations were accomplished objectively by an appointed committee consisting of four permanent representatives and one representative from each of the various plants.

With the relative values between jobs established, correlation charts were drawn, labor grades determined, and rate ranges assigned on the basis of an area rate survey. This program was then set up, installed, and administered by the wage administration division of the personnel department.

The various parts of the program discussed above were carried out during the off-season months. Then, prior to the beginning of the actual packing season, a month was devoted to the more important pre-pack problems.

During this period, three additional time-study men (wage incentive clerks) were added to the department organization. These new men, being seasonal help, were trained along with the permanent staff in a review session which covered time-study technics, the method of incentive application, and the work of the production engineering department during the prior six to nine months.

These sessions were important because the entire department operation is based upon a standardized operating procedure within the department itself. All men in the department use a standardized time-study technic which includes standardized leveling and rest allowance practices.

By employing such a system, any two time studies can be compared directly, and differences shown will be equitable. This means that studies made in any one of the seven plants compare favorably with those made in any of the other six plants. Where possible, the labor line-up for the seven plants was also reviewed and standardized.

By carrying out this pre-pack standardization, we were assured that it would be much easier to meet the problems entailed in the actual standardizing of the line-up after the pack had started.

Two to three weeks prior to the beginning of the pack, a refresher course was given to the plant supervisors. At this time they received the material covered during the off-season months after the supervisory training program. In addition, all the job-training technics were reviewed and made ready for the coming pack.

One to two days prior to the pack, the seasonal employees also were given a short indoctrination course. This program explained the company's rules, working time, employment procedures, and the new production engineering program.

P. E. Work In the Packing Season

It was decided, as a part of the program, that during the packing season production studies were to be undertaken and wage incentives installed as quickly as possible consistent with good work. Subsequently, all work standards were set up systematically according to an approved method of time study. Operations were timed by means of a stop watch and then leveled to a normal working time with proper allowances given. The allowances were in varying degrees depending upon the fatigue resulting from the performance of different jobs. The final standards were set up in terms of standard hours.

The ensuing wage-incentive application was on a group basis, with the standards specifying the number of people required to perform a definite amount of work. Incentive was then paid daily to the group that surpassed the standard production.

Delay periods over which the worker had no control were not calculated in the standard; the employees were paid a base hourly rate during delay time.

Either directly or indirectly, 87 percent of the plant labor was on incentive during the pea pack and 82 percent during the corn pack. Employees omitted were those not directly concerned with production operations.

An important phase was the setting up and control of cost reports. The daily performance and incentive-earning figures were made available daily to management for control purposes—not only to the local plant management but also to the central-office management.

During this one packing season, both the pea and the corn pack in the seven company plants were put on an incentive basis. There were 10 incentive groups at each plant during the pea pack and 14 incentive groups at each plant during the corn pack.

Aside from establishment of these standards and incentives, the personnel of the production engineering department followed through in other ways:

1. They brought the plant-layout and process charts up to date.

2. They made work simplification and methods studies on various operations in their own particular plants.

3. They took approximately 2,000 ft. of 16-mm. motion picture film of the various operations. This film will be used for future training programs and methods work.

(*Turn to page* 116)

Endorsed for Use by Other Processors

"In the final analysis, Minnesota Valley believes that there is a definite place for production engineering in highly seasonal industries—if the program is properly applied and maintained. In fact, these sound principles can be applied to all industries, whether they be seasonal or non-seasonable, labor or clerical. It is only the method and extent of the application which will vary in individual circumstances.

"The essential components of such a program are:

1. An overall application suited to the needs of the individual company.

2. A well-organized department to carry out the program under carefully defined functions, responsibilities, and authority.

3. Selected and well-trained personnel to carry out the functions of the department.

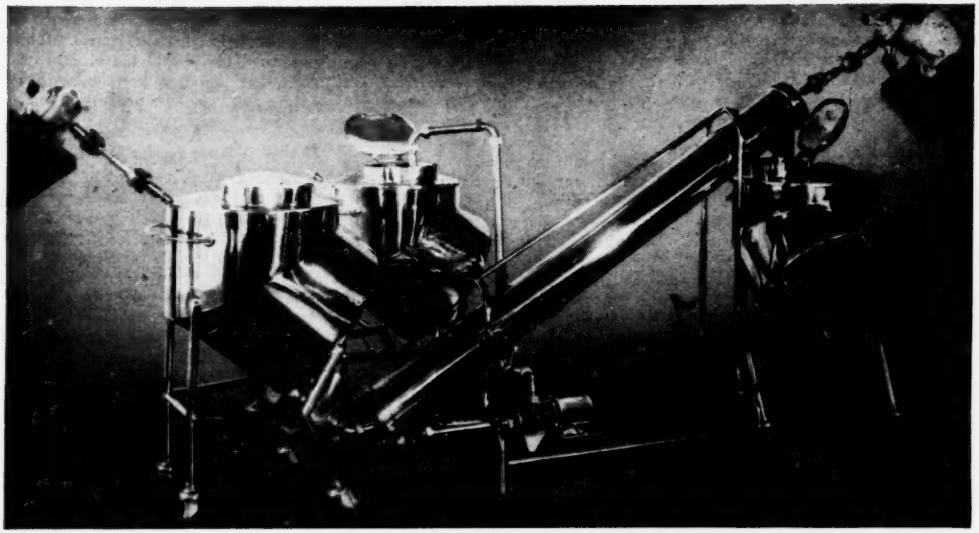
4. A fair and equitable wage-rate structure built upon a sound job evaluation procedure.

5. A well-defined maintenance and follow-up program to see that ideas and methods are installed and carried out.

6. A continuous promotional program aimed at keeping everyone interested in the production engineering principles.

"To be successful, a production engineering program must include a series of training conferences and meetings with labor, supervisors, and management.

"Above all, if the utmost benefits are to be gained from this program it must be firmly established. And it must be given ample time to prove its function without demand for extensive monetary savings at the very outset."—The Authors.



TO perform an operation for which no suitable unit existed, Abbotts' engineers designed this berry and juice separator.

Supply Plus Engineering Equals Quality

Eastern dairy company proves it—by adding Midwest plants for constant cream flow and by developing new processes and equipment, thus assuring first class product

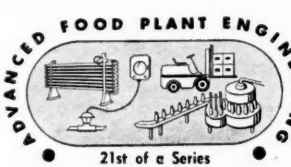
IVAN C. MILLER
Editorial Consultant, "Food Industries"

Establishment of a sustained supply of top quality cream for the Abbotts Dairies' eastern plants—a supply entirely independent of the local milk sheds—was the ambitious target initially set up by Company President C. R. Lindback.

That target has now been hit, and precisely. Today, the required flow of quality cream has been realized at company dairies in Audubon and Atlantic City, N. J., and at the dairies and ice cream plant in Philadelphia. Notable in the operation has been the constant development of new equipment and technics.

Perfecting the plan required the solving of many problems, with an accent on advanced food plant engineering. First step was to establish plants in a milk shed with an adequate supply of the quality product required. This was done with two large creameries, located at Cameron and Bruce, Wis. Another step was to assure the quality of the product until time of use. This was attained in part through the payment to producers of a cash bonus for the extra care necessary to produce milk with a bacteria count below 25,000. All cattle must be regularly tested for tuberculosis. Today, over 1,100 farms supply daily 500,000 lb. of milk which meets this requirement. Abbotts' own collecting system, using only insulated trucks, insures maximum protection of the milk between farms and creameries.

Production of milk on farms varies from month to month, so does the sale of bottled cream and ice cream. To solve this problem Abbotts developed, in its Wisconsin plants, a method of separating, cooling, and packing concentrated cream containing 80 percent butterfat, double the content of heavy cream. This product is so low in bacteria, so free from feed flavors and metallic contamination, that it can be held at subzero temperature from the flush season to the season of short production and used in combination with fresh dairy products to make an ice cream equal in quality to that produced in the flush season. Abbotts is thus able to balance the supply and demand for cream that meets its quality standards, independent of local markets.



This concentrated cream is packed in standard 5 gal. triple-walled paper cans. It is transported from Wisconsin to Philadelphia in temperature-controlled insulated trailer trucks refrigerated with dry ice. When the trucks arrive at the ice cream plant, the cans are transferred by a specially designed elevator and conveyor to low-temperature holding rooms for storage until used.

New Type Cutter

Although the 80 percent butterfat cream is better and of more uniform quality than that previously obtainable, mechanical problems were involved in getting the frozen product into the heated mix make-up. There was also a small loss of quality between the time of the cream's removal from storage and its addition to the mix make-up. This quality loss has now been eliminated and the efficiency of processing improved through the use of a cutter

designed by Abbotts' plant manager and engineers.

The cutter is built of stainless steel and is designed to handle products without their being touched by human hands. Two functions are performed by this machine: (1) It cuts the paper can lengthwise so the cylinder of frozen cream may be mechanically rolled into the second section of the machine, where (2) a hydraulic ram presses the frozen cream against a revolving blade which rapidly reduces it to unmelted flakes. The flakes fall into a heated stream of fluid dairy products which is pumped into two stainless steel mix make-up tanks.

Operated alternately, these tanks provide a continuous flow to the final pasteurizing holders. The cutting machine also provides an improved method of introducing chocolate and egg yolk into the mix. These products must, of course, be packed in the same type of container used for the concentrated cream.

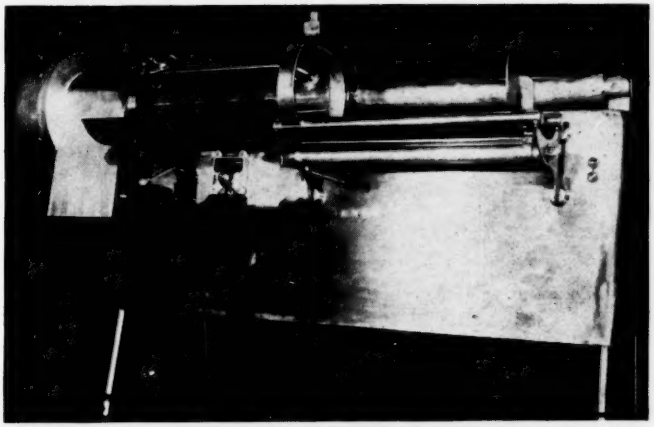
As far as possible, flavoring ingredients are processed in Abbotts' plant. Their manufacture is supervised when carried out by others. The processing of frozen fruits and berries and the manufacture of chocolate are thus controlled. In season, fresh fruits and berries are prepared in the plant. Nuts are roasted there. Vanilla flavoring is made from Mexican vanilla beans. These are chopped, mixed with sugar and pulverized. To obtain quality control, uniformity, and delicacy of flavor, special stainless steel preparation equipment is used. When no equipment is available to meet the needs of process improvements, Abbotts' engineers design and perfect machines to do the job.

Berry and Juice Separator

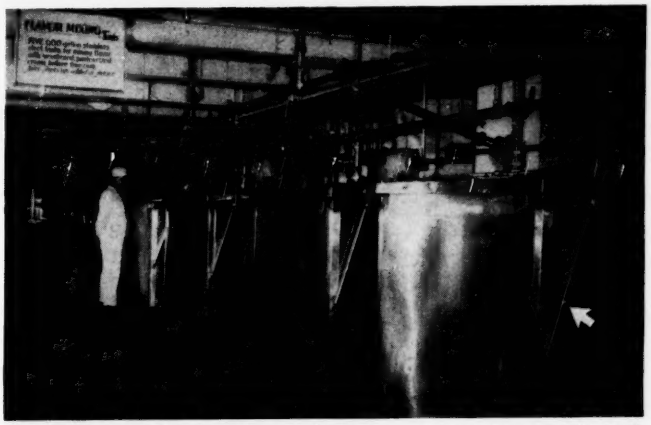
As an example, a machine was designed for continuously separating juice from berries and fruits. To meet sanitary requirements, the machine is constructed entirely of stainless steel and can be completely taken apart for cleaning and sterilizing.

The unit includes mobile containers equipped with stirrers for the berries and juice before separation, and similar containers to receive them afterwards. The separator consists of a conveyor inside a perforated shell. An outer tube collects the juice, which drains to the bottom of the inclined separator. From here it is pumped into the juice tank. The fruit discharges from the top of the inclined tube into a third portable container. The juice is incorporated in the mix in the flavor-mixing tanks, and by means of a fruit injector, the fruit solids are mixed in the stream of ice cream leaving the freezer.

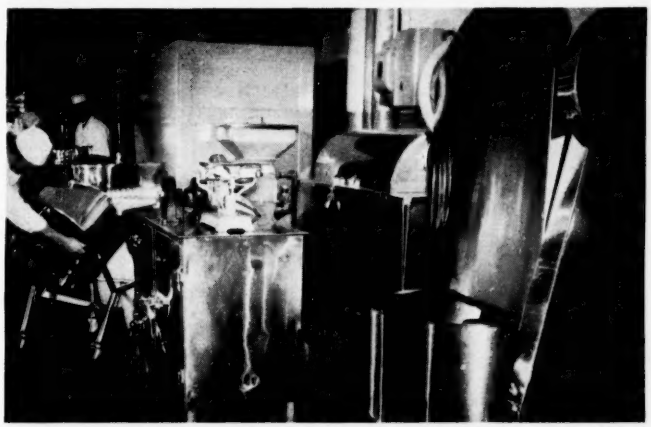
These Engineered Devices Are Furthering Efficiency



BY means of this unit, which cuts and facilitates removal of paper can, then flakes the frozen cream, the cream is incorporated directly into the mix.

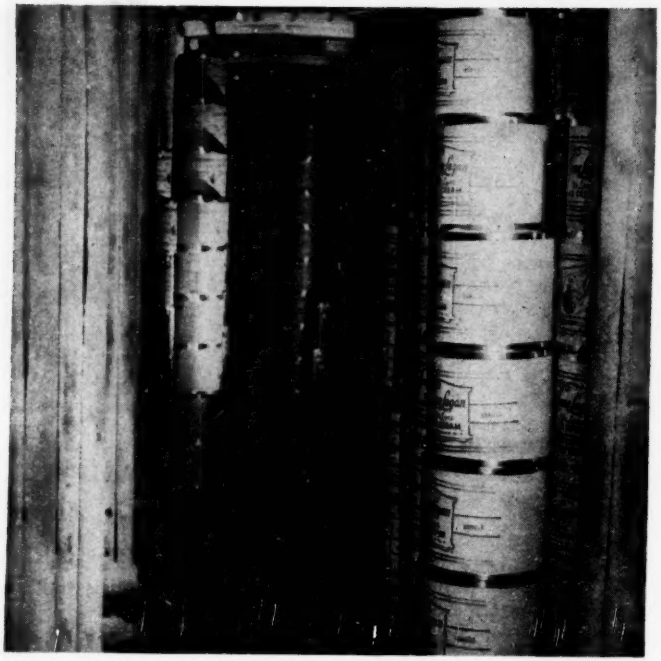


THROUGH installation of hydraulic checks (arrow), operation of raising and lowering the lids of flavor mixing tanks is made easier and less hazardous.

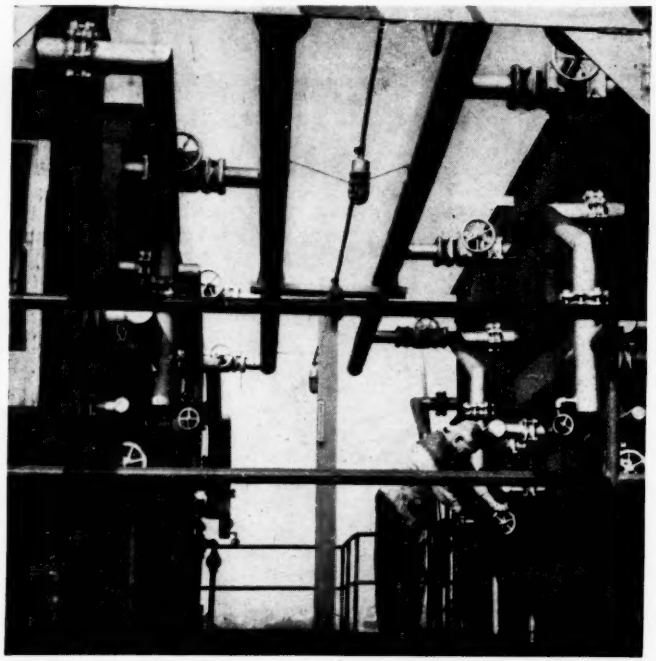


AND in this equipment, vanilla flavoring is made from Mexican vanilla beans which are chopped, mixed with sugar and pulverized.

Advanced Refrigeration Improves Product, Cuts Costs



VERTICAL coils in hardening rooms speed up freezing of ice cream.



SEVEN evaporative condensers replaced spray pond, augmenting efficiency.

Abbotts Dairies operates four milk plants—two in Philadelphia, two in New Jersey. Daily requirements of milk are hauled directly to these plants from nearby farms and from eight receiving stations in Pennsylvania, New York, and Maryland. Two of these stations are equipped for milk condensing. The ice cream plant is supplied with fresh milk and concentrated milk from these plants.

In addition, the ice cream plant is equipped with a stainless steel vacuum pan for processing milk during the flush months. The milk is condensed to between 3¼ to 3½ to 1 in this pan, which has a capacity of 4,000 lb. per hr. Processing temperatures range between 138 and 140 deg. F.; vacuum from 25 to 27 in. Until used, the condensed product is held in horizontal stainless refrigerated tanks, equipped with bottom-end agitators.

Engineering improvements and applied technology have not been confined to processing. The refrigeration system has been modernized and the building structure improved. Much engineering has been applied to the removal of accident hazards to employees, resulting in many company-designed safety devices. The products themselves are constantly modernized to meet changing consumer demands. This tailoring of the product has necessitated the designing and engineering of new packages, as well as changes in equipment to produce them.

Modernized Hardening Rooms

The low temperature refrigeration effect in the ice cream hardening rooms is obtained through the use of vertical banks of direct-expansion ammonia coils. These vertical coils form small, three-sided bins. Rows of these bins, facing each other, are separated only by the width of a can conveyor and narrow runway. Each package of ice cream is thus stored within 2 or 3 ft. of refrigeration coils. In addition, air is circulated by 15 unit coolers. This air is not only refrigerated in the unit, but also in passing through the vertical compartment coils every few feet of its travel before it reaches the packages.

The extensive use of these vertical coils has several advantages. Maintenance of uniform low temperature is more certain than with other types of coils. Frosting on the coils is held to a minimum, despite the constant flow of products and traffic in and out of the hardening rooms. When frosting does occur, the vertical coils are easily scraped. This can proceed locally, avoiding general disruption in the hardening rooms. Since the packages are stacked in bins formed by the coils, taking inventory is simplified.

Hardening room improvements, and the increased use of 80 percent butterfat cream have increased low temperature refrigeration requirements. This has resulted in modernization of the refrigeration system through installation of two-stage ammonia compressors and evaporative condensers.

New Condenser System

Water for the ammonia condensing system was originally cooled in a spray pond. This has been replaced by seven unit evaporative type condensers which derive their efficiency from primary air-blast cooling and secondary cooling in water-sprayed tubes. The spray water, in turn, is air-blast cooled in the unit.

There have been two important accomplishments resulting from this change-over. Head pressure on compressors has been reduced to between 125 and 150 psi. Suction pressure now ranges between zero and 4 in. of vacuum. This has materially lowered power consumption. The savings in water through use of the new system has been approximately 90 percent. And water economy is becoming more important than ever in food processing.

Packaging Speeded

Wherever possible, packaging operations are performed by mobile packaging machines. Manual operations are required, however, on some of them. One recently installed machine automatically forms the packages for pints, fills them within weight tolerances, and closes them.

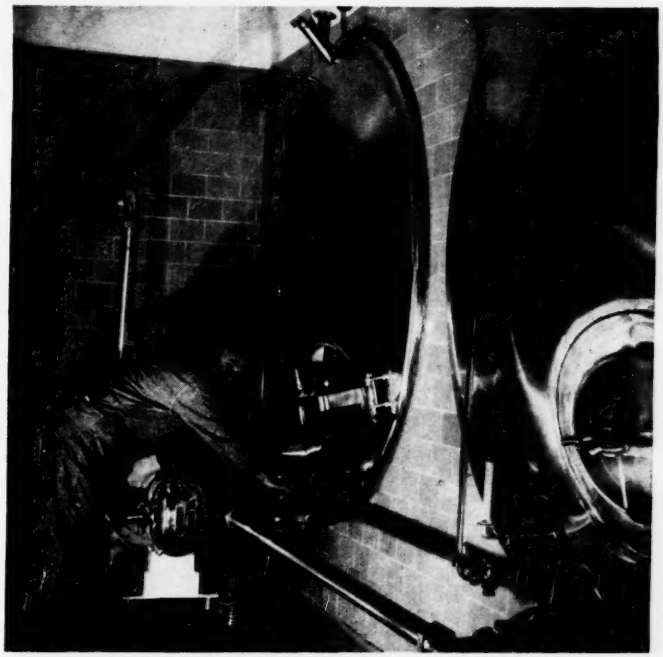
Though the 15 continuous freezers are modern, changes have been made in the discharge outlet to enable continuous formation of new types of bricks or rolls. One such improved outlet brings three flavors together in a roll in concentric rings. Introduction of this new product required intricate packaging design and fabrication to produce a container suitable for marketing (see page 116, Aug. 1947, FOOD INDUSTRIES).

Modernization has also been extended to the selection of ingredients, or the form in which they are used. The change-over from granulated sugar to refined sirup is an example of this. It has minimized handling, increased formula accuracy, and insured greater sanitation. This change-over had to be engineered into the process.

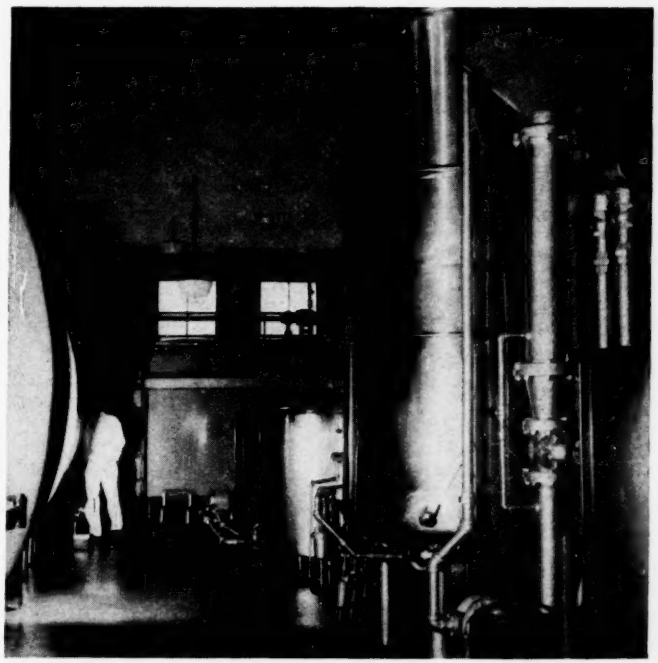
Sugar sirups are stored in three horizontal stainless steel tanks with a total capacity of 12,500 gal. The heads of the tanks project through the wall of a tiled room which can be washed and kept sanitary. Access to the tanks is through this room, which contains only the sanitary pump used

(*Turn to page* 116)

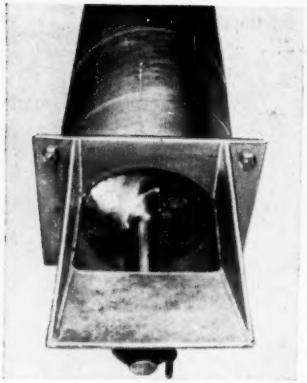
Stainless Steel and Tile Aid Sanitation

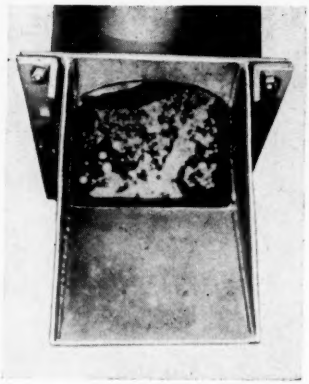


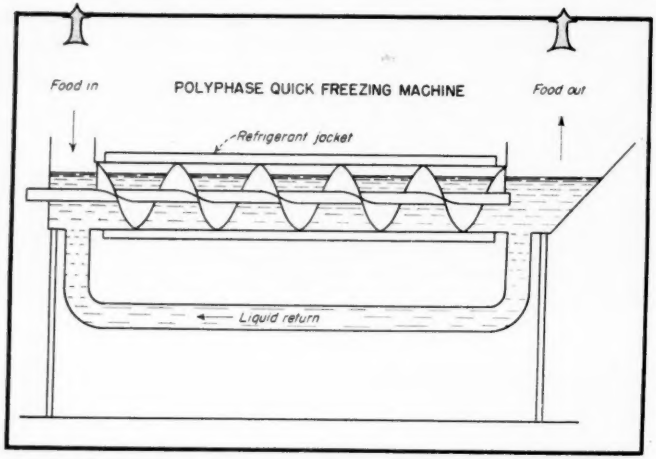
REFINED syrup tanks project through tiled wall into small, easily cleaned room.



VACUUM pan was installed in Abbotts' ice cream plant to handle surplus milk.







APPARATUS used for quick freezing in sugar-type solutions is shown schematically above. The central spiral mechanism rotates slowly to move the food through the machine. Upper left photo shows opening through which the food enters. Upper right photo illustrates the exit end. Seen here is mold growth which was target of preventive studies described in this article.

Molds and Bacteria Curbed In Immersion-Freezing

Studies show how benzoic or acetic acid inhibits development of organisms in sugar-type media

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Assistant Professor of Drawing, and
KENNETH W. COSENS
Assistant Professor of Civil Engineering,
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Decided advantages have been credited to the use of immersion freezing solutions in the polyphase quick freezing process*—high rate of freezing (only a few minutes for most foods); loose packs; and minimum dehydration during storage. There are also many mechanical advantages with the use of the light, compact polyphase freezing apparatus (illustrated above).

But, since the food comes in direct contact with the sugar-type freezing solution, there is a rather complete seeding of this solution with yeasts, molds, soil bacteria and possibly pathogens. Hence, it is especially important that sanitary methods be used, because many frozen foods are consumed without cooking.

To prevent such spoilage, a study was recently made at the University of Texas with the major aim of investigating and developing inhibitors which could be added to the medium. The data gathered are presented here. It is believed they will benefit many groups of investigators and food processing industries.

Even though this work was specifically concerned with one type of freezing medium, it is surmised that the effect would be generally the same in other means of food preservation, processing and handling.

Several Inhibitors Investigated

Five different chemicals were used—alcohol, sodium benzoate, benzoic acid, propionic acid and acetic acid. Germicidal light was also studied.

Best results were achieved with the use of benzoic acid or acetic acid. Propionic was effective, but permitted fermentation after a two-week storage period. Ethyl alcohol prevented mold growth but also evaporated easily and required governmental control. Germicidal light at an intensity of 0.5 w. per sq. ft. did a good job, but could also cause skin or eye irritations from overexposure.

A simple method appeared to be adding a teaspoon or so of acetic acid or benzoic acid to the solution when it was made up, and no further care was required.

A typical sugar freezing solution—composed of sucrose, 24 percent by weight; dextrose, 29 percent by weight; sodium chloride, 1 percent by weight, and tap water, 46 percent by weight—was used throughout the study. A series of test tube quantities was first investigated to give the approximate desirable concentrations of the inhibiting chemicals.

Various percentages of the different chemical inhibitors were added to test tubes containing small amounts of the freezing solution, which previously had been inoculated with molds and bacteria. Visual observations were made at regular intervals, and records were made of the approximate percentages of the chemical which inhibited the growth of surface molds or the fermentation of subsurface growths producing cloudiness.

Alcohol and Sodium Benzoate

A 5 percent content (by volume) of undenatured ethyl alcohol was needed to prevent undesirable growth. It

* Developed by W. R. Woolrich and L. H. Bartlett at the University of Texas (Page 100, April 1948 FOOD INDUSTRIES).

was felt that this percentage would lead to some criticism by consumers. Also discouraging the use of this method is the fact that government control of the use of this type of alcohol would make it difficult to procure.

The tests with sodium benzoate showed that it would delay but not prevent undesirable growths, and that it acted only if the solution was rather acid. Relatively large amounts were needed to preserve the solution and then for only a week or two. These facts make this an unsatisfactory method.

Benzoic, Acetic and Propionic Acids

The results obtained in test tube experiments with benzoic, acetic and propionic acids were so promising that a larger scale study was made. In these investigations, beets, grapefruit, radishes, carrots, snap beans and beef were finely chopped and individually frozen. The freezing operation was carried out in a standard freezing solution to which had been added 0.06 percent propionic acid, with a second series using 0.07 percent acetic acid and a third using 0.04 percent benzoic acid.

The inhibiting effect of each chemical on the organisms present was measured by total plate counts on agar incubated at room temperature for 48 hours. Before the freezing operation, the counts were less than 1 organism per milliliter. The variations after freezing are shown in Fig. 1. It should be noted that the concentration of the chemical inhibitor in the freezing solution is less than 0.10 percent in all cases.

The values plotted for zero days indicate the number of organisms immediately after the freezing operation. It appears that benzoic and acetic acids are the most desirable inhibitors, since the solutions appear to be perfectly preserved. No scum or floc developed, and the clean, fruity odor of the food juices in the freezing medium did not change. This same condition prevailed ten weeks later. In the first few days, some mold colonies, in addition to bacterial colonies, developed on plates from the benzoic and acetic solutions. Later, only a few strays appeared.

The propionic acid inhibited all mold growth. But at 17 days, fermentation began with the production of gas and a floating floc. There was a slight alcoholic odor, but no unpleasant or putrid smell was detected. The tremendous jumps in the total plate count for propionic acid solution, observed at this time, indicated that the fermenting organism—probably a yeast—had been dormant for 15 or 16 days.

Some concern might be expressed regarding the amount of chemical clinging to the food, but it has been shown that the amount of freezing medium adhering is about 6 to 12 percent for gravity draining and probably much less for centrifugal draining.[1] In many cases, the food is rinsed before serving, which would reduce the adhering medium to a negligible amount. It would undoubtedly be safe to have in the freezing medium a concentration four or five times as strong as is permissible in the food when consumed.

Germicidal Light

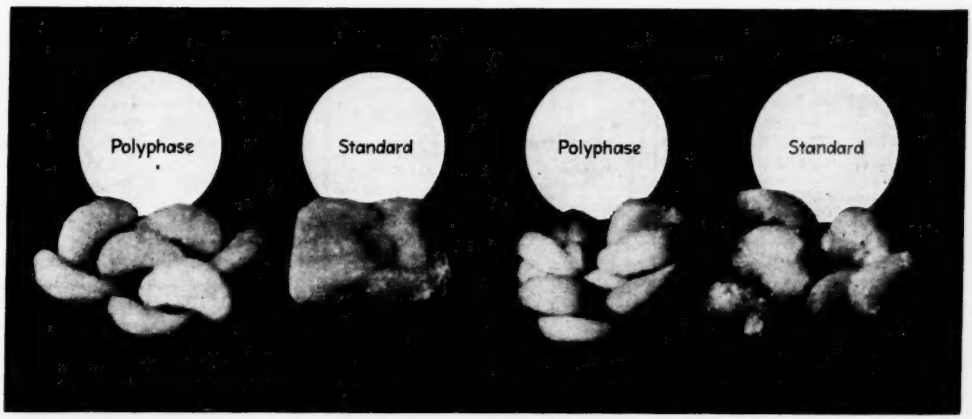
It is well known that sunlight will kill germs, but for most purposes it is an inconvenient and undependable sterilizing agent. The effective energy is entirely in the ultraviolet region beyond the range of human vision. Our atmosphere is opaque to the most lethal wave lengths, with the result that only a very small part of the sunlight reaching the earth is in the germicidal region. The graphs in Fig. 2 (taken from Luckiesh[2]) show these relationships very clearly. Note that ordinary glass is of such composition that none of the germicidal energy can pass through it.

The recent development of the low pressure mercury arc has made germicidal light inexpensive and convenient. This lamp is identical with the common fluorescent lamp, except the tube has no phosphor coating, and the glass is a special type which transmits shorter wave lengths than ordinary glass.[3] The low pressure mercury arc is remarkable in that so much of the energy is radiated at one wave length, namely 2,537AU (Angstrom Units). The amount of germicidal light necessary to kill varies greatly, but the lethal wave lengths are about the same for all organisms. The maximum effectiveness is in the 2,500AU-2,800AU region,[3] which is shorter even than the ultraviolet that causes sunburn and tanning.

However, overexposure to this 2537AU radiation will cause a painful irritation of skin and eyes. A dosage of about 1w. per square foot for one minute is sufficient to cause a reddening and soreness of the skin.[4] The eyes are about three times as sensitive, but ordinary eyeglasses will protect them, except for light that may come in at the sides.

The 2537AU radiation has very slight penetrating power in most substances. With solids particularly, this means that the sterilizing effect is almost entirely on the surface. Of the ordinary liquids that might need to be sterilized, water is by far the most transparent to this wave length.

Distilled water requires a depth of 115 in. to absorb 90 percent of the germicidal energy in the region of 2537AU.[5] Average tap water requires



HOW GRAPEFRUIT SEGMENTS prepared by polyphase quick freezing method compare with the standard-frozen fruit.

about 1 ft., varying widely, dependent upon the mineral content. Luckiesh[4] also lists the depths in inches of other typical liquids which absorb 90 percent of 2537AU energy: Brown sugar sirup at 0.02; colorless sugar sirup at 0.38; bottled Coca Cola at 0.03; whole milk at 0.003; and egg white at 0.2. The typical sugar solution used for quick freezing is quite brown due to the use of imperfectly refined dextrose, and the transmission value is probably somewhere between the two sugar sirups listed above.

Buttolph[7] has shown that it takes about 1½ min. at 1w.-per-sq. ft. intensity to kill the more resistant fungi. This exposure should also kill nearly all the bacteria, since they are many times more susceptible. If the penetration of this solution by the germicidal light were known, it would be possible to calculate the average exposure each particle in the liquid would receive in a certain time. Lacking this data, the laboratory tests described below were made to obtain direct information on the effectiveness of the germicidal light in this liquid.

Test Germicidal Light

The source of the ultraviolet light employed comprised two standard 15w. germicidal lamps with a reflector. This light fixture was placed so that the tubes were 11 in. from the surface of the liquid giving an estimated intensity of 1w. per square foot.

About a 1½ in.-depth of the sugar solution in a white enameled pan was well seeded with bacteria and mold spores. The liquid was circulated constantly so that all organisms in it would receive the average exposure. Samples of the medium were taken at short intervals, plated on Bacto nutrient agar at 25 deg. C. for 40 hr., and the results were plotted as Run No. 2 on Fig. 3. A similar run was made on a freezing medium that was made with a more highly refined dextrose, which gave a more nearly colorless solution. The results of using the clearer solution are plotted as Run No. 3 on Fig. 3.

Exposure Time

The abscissa of this chart indicates minutes of exposure of the medium to the germicidal light. For Run No. 2 about 8 min. were required to kill 90 percent and nearly 1 hr. to kill 99 percent of the organisms present. It is believed that the reason for the change in slope of the death curve is that, in the attempt to duplicate operating conditions, a mixture of organisms was used rather than a pure culture, which would undoubtedly give a straight line.

It appears that the more susceptible bacteria were killed during the first phase, while the more resistant species of molds, etc., caused the slope to flatten in the second phase.

So successful were the small-scale tests that a 15-gal. capacity polyphase freezer (shown schematically at beginning of this article) was charged with freezing solution and a mixture of foods was frozen. Unsanitary methods were practiced in preparing the food and feeding the freezer, so there would be a generous seeding of the freezing medium by bacteria and molds.

Germicidal light was applied at the food inlet and at an intensity of 1w. per square foot before and after the freezing operation. The freezing solution was allowed to remain at room temperature, except for the short freezing period. The circulating mechanism of the freezer was allowed to operate continuously to provide a turnover of the medium and insure proper exposure to the light.

At the end of seven days some mold colonies appeared at the surface of the food outlet end.

The lights were then changed so there was an intensity of approximately 0.5w. per sq. ft. at both ends of the freezing unit. Thirteen days after the first freezing operation, more food was frozen in the same solution after first being strained through a cloth to remove ants and food particles that might remain.

Thirty-one days after the first food was frozen, a slight alcoholic odor developed and a scum formed on the liquid. This scum—apparently food particles risen from the bottom upon fermentation—was removed and the solution strained again. At 54 days after the first freezing, no further change was observed in the solution, indicating that the germicidal light was effective.

Total plate counts immediately after freezing were from 5,000 to 8,000 organisms per ml. Two days after a freezing run, the count dropped to about 20 per ml. and remained below this figure for a period of at least 16 days.

References

1. "Polyphase Freezing Process Developed; Low-Cost Unit Built," by Luis H. Bartlett and W. R. Woolrich, Food Industries, Vol. 13, No. 12, Dec., 1941, pp. 60-62; also Vol. 14, No. 1, Jan., 1942, pp. 62-64.
2. *Applications of Germicidal, Erythemal and Infrared Energy*, by Matthew Luckiesh, D. Van Nostrand Co., Inc., New York, N. Y., 1946, pp. 16, 19.
3. Ibid., p. 123
4. Ibid., p. 394
5. Ibid., p. 395
6. *Germicidal Protection and Disinfection*, by L. J. Buttolph, General Electric Co., Cleveland, Ohio, 1946, p. 20.
7. Ibid., p. 24
8. *Disinfection and Sterilization*, by Ernest C. McCulloch, Lea & Febiger, Philadelphia, 1945, p. 57.

Data On Effects of Treatments With Chemicals and Germicidal Light

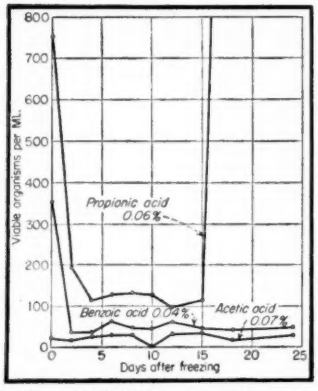


FIG. 1. SURVIVAL of organisms in chemically treated sugar solutions after their use as food freezing media.

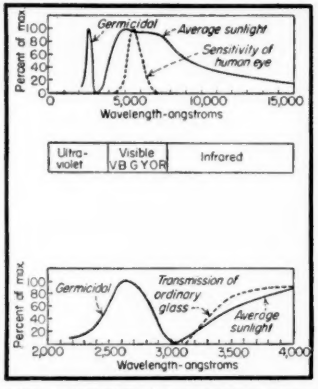


FIG. 2. CURVE of germicidal energy in sunlight, also transmission through ordinary glass (from Luckiesh).

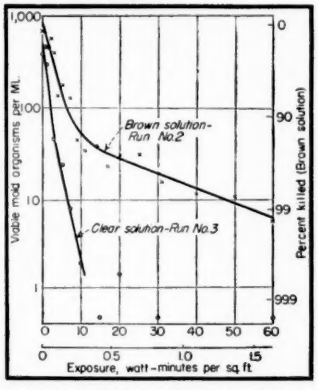
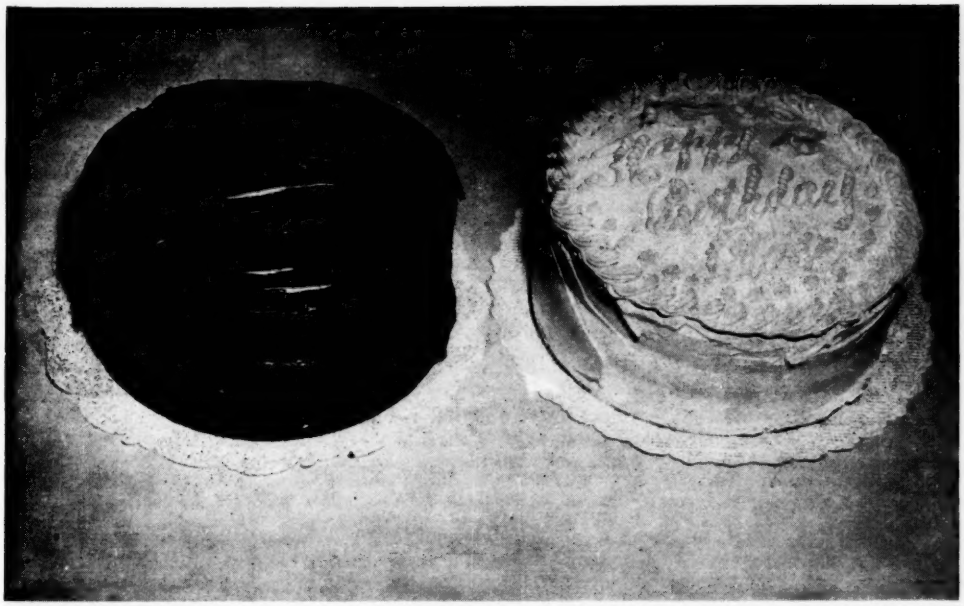

Viable mold organisms per ML.
Brown solution-Run No.2
Clear solution-Run No.3
Percent killed (Brown solution)
Exposure, watt-minutes per sq. ft.

FIG. 3. EFFECT of germicidal light on survival of organisms in the standard sugar solution.



GOOD CAKE ICINGS come easy for the enterprising baker who follows the rule of "proper materials, properly mixed."

Thirteen Factors in Making Quality Frostings

These icing guide-points cover proper ingredients, their best use, and ways to avert the four failures—chipping, sweating, fading, and stickiness*

OSCAR L. McGEE,
The Nulomoline Co., New York City

Bakers will find the preparation of good icings simplified—if they take care in selecting the proper ingredients and exercise judgment in their use.

Basic factors to consider are: First, the composition of icings, and second, the common difficulties encountered and how they may be corrected. Here, we have grouped these factors in the form of thirteen fundamental questions and answers:

1. What are the proper ingredients? Icings or frostings are glazings or coatings of sugar and various other ingredients blended together and pleasingly flavored to suit individual tastes. An understanding of taste and flavor —the likes and dislikes of the people whom we serve—will be of the utmost value in determining our success or failure with icings.

The icings consist of sugar, fat, milk or milk solids, aerating agents (such as fats, eggs, and gelatins), water, and a small amount of salt and requisite flavoring to form a smooth pliable plastic mass. Sugar, the most important ingredient, should get the most attention.

Types of Sugar

The baker gets his sugar in varying forms. Usually, he buys 4X or 6X sugar. Then, for an extra smooth icing he will buy fondant, which is the "answer to the baker's prayer."

This fondant is generally made of sugar, corn sirup, invert sugar, and water—the proportions varying from one manufacturer to another.

Our company has found, in its experiments with icings and sugars, that a good sugar balance for a fondant is 85 parts of sugar, 10 parts of corn sirup, and 5 parts of invert sugar. This balance produces fondant for an icing that will wrap nicely. More invert sugar can be used for unwrapped cakes—a choice which may be left to the individual baker.

Some might ask, "Why this balance?" The reason is that the crystalline sugar must be controlled so it will not dry or chip off the cake. Hence, invert sugar is used, and also, a binder—the corn sirup.

While use of this sugar balance will not prevent the sugar from crystallizing, it will retard it. The size of the crystals will be many times smaller than those of even the finest sugar procurable.

Shortenings Play Important Role

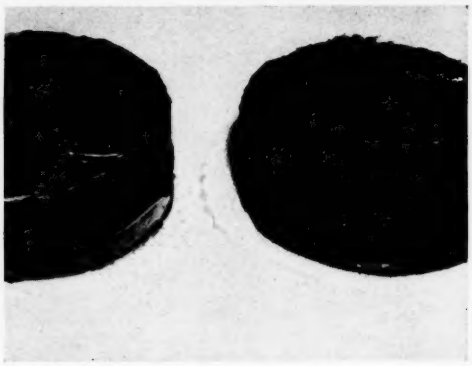
The next major ingredients—the fat or shortening—should also come in for close observation, and be used in the manner in which they will do the most good.

First of all, the type of icing that is to be made must be considered: (1) Whether it is to be used for cakes, cookies or sweet goods; or (2) whether it is a butter cream, a plain cream, a water-type, or a non-sticky type icing. Any of these four icings may be used for cakes. But for cookies and sweet goods (yeast-raised), a semi-flat icing —of a water or fondant type—is employed.

* Based on paper, "Icings, How, When and Why, Ingredients, Processing, Application," recently presented by author at Metropolitan Production Men's Club in New York City.

These Are the Common Troubles

Too-dry frosting chips off cake.



Or fades and loses gloss (right).

In making a butter cream icing, the fat should be a sweet butter, if a superior grade icing is desired. In a lower-priced icing, a mixture of hydrogenated shortening and butter may be employed. For best results, however, butter creams should always have egg white and sugar in addition to the butter.

The shortening content in a full-butter cream ranges from 20 to 25 percent of the total icing. The shortening content in plain cream icings varies from 10 to 17 percent. In water-type icings, the shortening runs from 2½ to 5 percent. Non-sticky icings are similar to the butter creams, except that surface-drying materials are added.

To give icings good gloss and quick-setting properties, the recommendation is 2½-to-5 percent high melting point coconut fat (84 to 92 deg. F.), depending on climatic conditions. This, of course, must be bolstered by other drying materials, such as egg white, gelatin, milk solids (non-fat), or agar-agar.

Milk or milk solids should be used up to a total of 5 percent, based on the total icing weight. Either ingredient enhances the flavor of icings, gives setting properties, is high in food value, and provides a flavor liked by most people.

Flavors Must Blend

The flavor of an icing must be pleasing—not too strong or not too weak. It should also blend with the flavor of the cake on which it is used.

The properties of flavor-carrying materials, such as chocolate and fruits, must be taken into consideration. Bottled flavors for icings should be of the best grade, and they should be properly used to derive the most benefit.

Fats, of the hydrogenated type, are bland in flavor. However, butter will enrich the flavor of icings out of proportion to the quantity used, particularly if salt and milk or milk solids are used.

There are flavors especially developed by cooking, such as in the preparation of caramel and butterscotch. Usually, these products can be obtained from supply houses in quantities and at prices which permit the baker to use them widely.

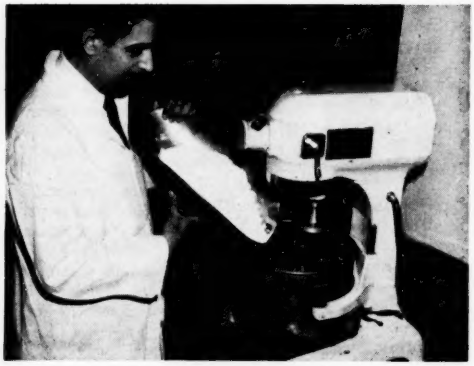
Flavors should be considered from two angles—the flavor of the cake and the flavor of the icing. The flavor in the icing should blend pleasingly with that in the cake. The natural flavors in the icing must be considered so that when bottled flavors are added, all combine to produce a pleasing, palatable flavor.

Taste in icings, as we all know, has a definite influence on the eating quality of the cake. Icings and fillings improve the eating qualities of a good cake and, in a measure, tend to compensate for any deficiencies in the flavor of the cake.

We may rest assured that if the

And These Are the Steps

Correct balance of correct ingredients.



Proper mixing of the right sugars.

Encountered With Icings

If too wet, it sweats and runs off.

And may stick to wrapper.

icing possesses a flavor which is either poor or too strong, the consumer will not make a repeat purchase, even though the cake may be of the best quality. Best policy in flavoring icings is to stick to the natural and pure flavors. The baker should use flavors carefully and never guess at the amount going into any batch. He should measure all flavors with extreme accuracy.

Flavors developed during cooking illustrate the fact that they come from skillful blending of materials and defy duplication by the chemist. These flavors are most apparent in caramel, butterscotch, and cream fudge.

Salt, although used in minute quantities, is of inestimable value in bringing out other flavors.

Making Light, Fluffy Icings

Aerating or drying agents are generally used to give icings quick-setting properties and to make them light and fluffy. These conditions are brought about by the addition of small quantities of egg white or gelatin—or by the creaming of fat and sugar. Other important drying materials that have an effect upon the moisture of icings are agar-agar, starches and gums of various types, pectin, and milk solids.

Moisture in icings can be incorporated as water, liquid milk or sweetened condensed milk—the last mentioned being a good flavor-producing agent when used in small quantities, although its moisture content is not sufficient in most cases to give icing of the proper consistency. The baker should be careful that the moisture content of his icings is kept in proper balance to assure uniform results.

2. What causes icings to chip and fall off bakery goods? Briefly, the condition is due to crystallization of the sugar and evaporation of the moisture. Remedy is to balance the sugar content with invert sugar so that the moisture may be retained and the crystallization of the sugars may be retarded.

3. What causes icings to sweat and run off bakery goods? This is the reverse condition of the preceding question. And it has three possible causes—(1) Improper balance of ingredients used in the icings, (2) incompatability of icings to weather conditions, or (3) too much hygroscopic material in the icing.

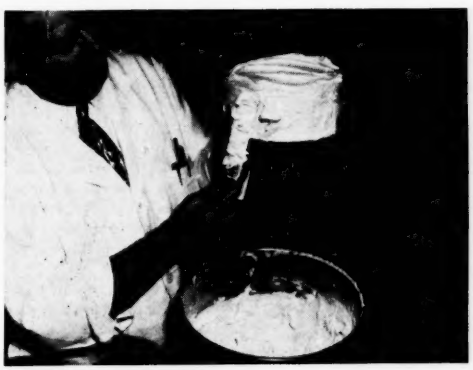
Two Remedies Cited

Invert sugar, while hygroscopic, is not always at fault in cases of sweating. In some instances, emulsifier-type shortenings have a highly hygroscopic ingredient which attracts moisture from the cake and the icing, thus causing sweating.

Bakers usually have this trouble during summer. The remedy would be either to switch from the emulsifier-type shortening to the regular hydrogenated shortening during hot weather, or to add a suitable moisture-absorbing material.

4. What causes icings to fade and

That Will Avoid Troubles



Result: Moisture-retaining icing, easily applied.

And a cake readily wrapped without sticking.

lose gloss and color? This condition is brought about by rapid crystallization of sugar and loss of moisture due to an unbalanced formula. One cure is to make adjustments—such as including more invert sugar in the formula. Another is to glaze the cake before it is iced, and thus prevent the transfer of moisture from the icing to the cake, or vice versa.

Overcoming Stickiness

5. What causes icings to stick to the wrapper? This seems to be one of the major problems of the wholesale cake baker in the humid, hot weather. Stickiness is caused by improper balance of moisture content and moisture-binding materials in the composition of the icing.

There are various stabilizers or drying agents that can be used to prevent stickiness. Among these are: Agar-agar, sodium alginate, Irish moss, cereal stabilizers, starches, milk solids, and various gums (gum arabic, gum karaya, and locust bean gum). Pectin can also be used in varying quantities — the amount depending upon the individual problem. The quantity of stabilizer used runs from 1 percent agar-agar to 4 to 5 percent milk solids, based on the total weight of the icings.

6. How may sugar best be used? The finest powdered sugar obtainable is the most satisfactory. This is subordinate, of course, to fondant, which everyone agrees is far superior because of its fine sugar grains, which give a much smoother icing than any sugar presently procurable from the refineries.

As already stated, the sugars should be balanced so that after the icing is applied, it will remain smooth and fresh. The quantity and balance of invert sugar in proportion to the other sugars will vary with the section of the country—high humidity, low invert sugar; low humidity, high invert sugar. Never consider the use of sugar except in the light of proper balance with other sugars in making icings, or for that matter, in any bakery product. Failure to use a proper sugar balance usually is due to lack of knowledge of the effect one sugar has upon another sugar.

Why's and How's of Flavoring

7. How may flavoring best be used? Icings should be well flavored, with the balance of flavors well thought out. The baker might take a leaf from the candy-makers' book, which should give him a good idea on how to flavor icings. When you eat a piece of good candy, there is no question about the flavor of it. The same should apply to icings. This does not mean that the flavoring should be strong, but rather that the predominance of the icing flavor should be sufficiently distinct so there is no question about it.

Chocolate-flavored icings should come in for our closest consideration. When people eat chocolate icing, they have in mind chocolate candy, and if the baker uses a poor grade of chocolate (or cocoa) that does not have a pleasing, rich flavor, he will be doing an injustice.

Fresh fruits should be used to flavor icings during the season in which they are prevalent. It is important, when using fresh fruit, to check closely its moisture content. Improper moisture content will throw the icing out of balance.

For instance, dates have a minimum amount of moisture, while strawberries have a maximum amount of moisture.

Thus, it is difficult to use enough strawberries in an icing to produce a strawberry flavor without introducing too much moisture into the batch. On the other hand, we can include enough dates in an icing to almost have date paste, without having an overage of moisture.

Proper Use of Fats

8. How may shortening be used most satisfactorily? A lot depends upon the locality in which the baker operates. If the trade will bear the price, a blend of regular hydrogenated shortening with enough butter to give a distinct flavor is the best policy to use in making icings. On the other hand, should cost factors not permit including butter in icings, it would be best to use hydrogenated shortening along with a small portion of coconut fat or cocoa butter for setting properties.

Hard fats are usually of the coconut variety. They come in slabs, with the melting point varying from 76 to 110 deg. F.

The baker should not use a blend of coconut fat along with cocoa butter — for while the melting points might be the same, the setting temperatures are usually found to be at variance.

For example, a 98 deg. F. melting point coconut fat will have a setting temperature of 92 deg. F., while a cocoa butter of a 92 deg. F. melting point would have an 83 deg. F. setting point. In other words, one fat will be setting while the other fat will be liquid.

This condition would tend to cause either "bloom" (loss of gloss) or fat separation in a chocolate icing. However, either one used alone will work well with regular hydrogenated shortening. As will be evident, it is good policy to use fats with melting points below the human-body temperature (98.6 deg. F.).

Butter and Milk Add Flavor

9. What of high-priced butter? Butter, as touched upon, usually brings the price factor to the fore. We all, no doubt, would prefer butter in icings to any other fat, since it is a favorite with most people. Too, it lends flavor to icings that we do not get from any other source. This is an economic problem to be worked out by the individual baker.

10. What are fundamental points in the use of milk? If the icing will bear the moisture content, the baker may use sweetened condensed milk, which has more flavor-producing properties than any other item in the milk group. However, milk solids, either of the whole or the non-fat solids type, can be used with good results. Fresh milk is rarely used in icings because of its tendency to ferment or go sour. If used, the baker should look to his milk when his icings become sour.

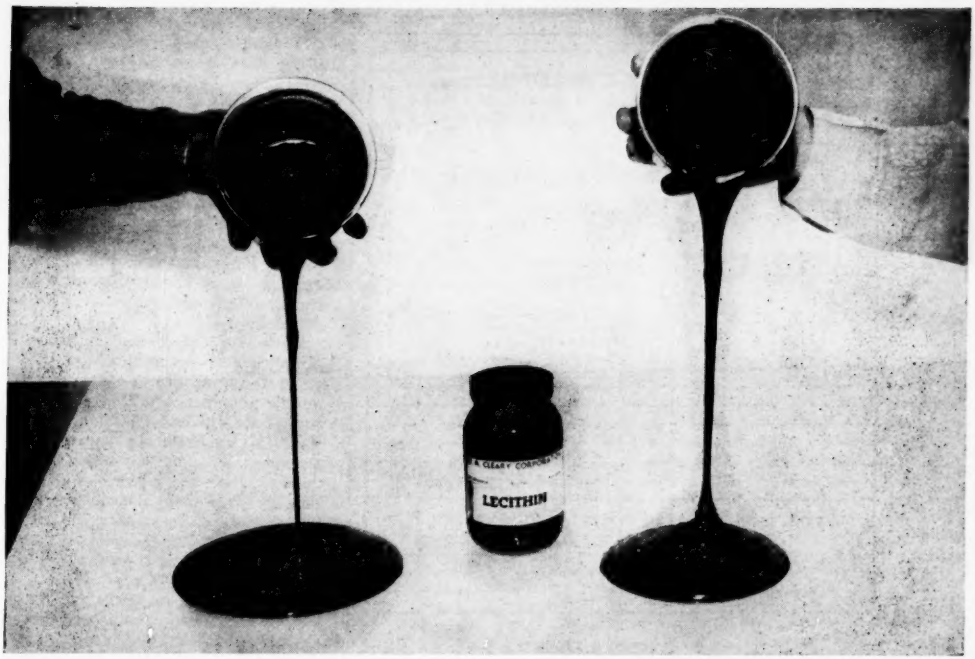
11. What are fundamental points in the use of salt? All icings should have a small amount of salt—usually 1/16 to 1/8 of 1 percent is ample. Salt's aforesaid faculty of bringing out the more delicate flavors is reason enough for its inclusion. Also, it will help remedy icings that are too sweet or too sharp in flavor.

Use the Right Icing for Wrapped Cakes

12. Should icings for wrapped cakes differ from those for unwrapped cakes? Yes, there should be a decided difference. Of course, cakes to be packed in boxes can take the same type of icing as the unwrapped cake, but a cake to be closely covered with cellophane (where the wrapper is in almost complete adherence to the icing) should have a non-sticky icing. If not, then the wrapper, when removed from the cake, will take most of the icing along with it. To make an icing for this type package, the baker must use all his ingenuity to assure a non-sticky icing.

13. How should we determine what icing to use? What is the usual procedure in the bakery? Do we just make an icing and apply it to the cake and send it out? Or do we make an icing and have it taste-tested by a select group in the plant to get an idea of what we intend to do with it, and to what cake we intend to apply it?

One of the greatest errors in the bakery today is the lack of taste-testing or sample-testing icings, cakes, or other bakery products. If this were done, there would be less sales resistance.



EFFECT of lecithin (0.3 percent) in reducing chocolate viscosity is seen (left). Chocolate (right) has no lecithin.

How Lecithin Affects Cost and Quality of Candy

It increases production, reduces amount of cocoa butter needed in chocolate, and improves quality of fudges, caramels, toffees, and brittles*

L. RUSSELL COOK

Vice-President,
W. A. Cleary Corp., New Brunswick, N. J.

Lecithin, when added to chocolate and other confectionery products, serves the useful purposes of cutting the cost of their manufacture, while at the same time improving their quality. Better quality in candies is the chief advantage in using lecithin for products like caramels, toffees, brittles, and fudges.

But first, a few words about lecithin: This name is given to a group of substances normally present in all living tissues—just as are fats, proteins, and carbohydrates. Commercial lecithin is not a synthetic substitute. Instead, it is a concentrate of the lecithin that naturally occurs in such vegetable materials as corn and soybeans. It is processed in such a way that it performs in food products with as nearly as possible the same efficiency as it does in nature.

All of the phenomena for which lecithin is responsible in chocolate and confectionery products is the result of one or more of the following characteristics: (1) Lecithin is surface active, (2) it reduces surface tension, and (3) it is an antioxidant.

Here is how the economies are achieved in chocolate products: Lecithin reduces the viscosity of chocolate, and hence cuts down on the amount of cocoa butter needed. Before the chocolate is molded, it is invariably brought to a predetermined fluidity or viscosity with cocoa butter.

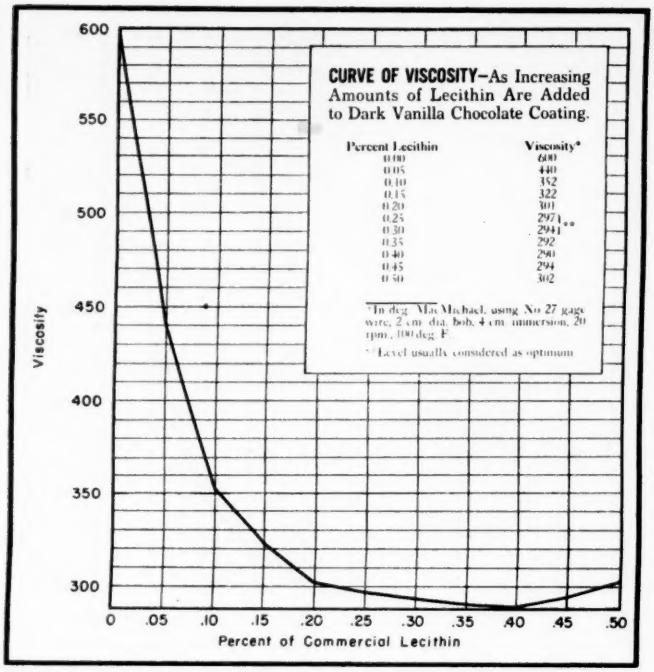
Since lecithin reduces surface tension, the desired viscosity can be obtained with less cocoa butter than would be necessary if lecithin were absent.

There are some limitations to the use of lecithin. Suppose you start out with a chocolate coating containing no lecithin, then gradually add an increasing amount of lecithin. You will find that each portion of lecithin added will reduce the viscosity of the coating to a greater extent than does the next portion added. This curve of diminishing usefulness gradually flattens out until a point is reached where continued additions fail to further reduce the viscosity of the chocolate. As you proceed to add even greater quantities, you will find that the viscosity curve actually begins to rise again. Thus, you finally begin to defeat the purpose for which lecithin is added.

While the savings of cocoa butter that result from the use of lecithin are of vital economic importance, the effect upon quality should not be glossed over too lightly.

Before high-speed equipment was used in the chocolate and confectionery industries, the percentage of cocoa butter was considerably lower in fin-

* This article is based on paper, "Lecithin in Chocolate and Confectionery Products," which was presented by author at annual production conference of Pennsylvania Manufacturing Confectioners' Association.



DOWN goes viscosity of coating as more and more lecithin is added—until 0.25-0.30 level is reached, at which time curve flattens, then rises.

ished chocolate products than is often found today. At that time, chocolate manufacturers used the amount of cocoa butter that gave them the best quality. And they were under no compulsion to use cocoa butter as an assist to rapid depositing or enrobing.

It was only after high-speed equipment was installed that chocolate manufacturers found it necessary to use more cocoa butter. They added more cocoa butter not because the quality of the products was thus enhanced, but because there was thus produced the fluidity or low viscosity required to run high-speed machines.

Actually, they sacrificed a certain amount of quality in the interest of mass production. For, when these excessive amounts of cocoa butter were added, the chocolates became somewhat greasy compared with those made by the older methods. The use of lecithin as a means by which fluidity for high-speed machining can be secured permits the maintenance of percentages of cocoa butter which are once again limited by consideration of quality only.

How Lecithin Steps Up Production

In the manufacture of chocolate, lecithin is usually introduced just prior to final viscosity adjustments. Its use is not entirely limited to this function.

It is possible, for instance, to use 1 or 2 oz. of lecithin per 100 lb. of chocolate in the mixing operation and also during the conching. Judicious use of lecithin at either of these points considerably reduces power requirements as a result of viscosity reduction. Or, if power reduction is neither necessitated nor required, usual mixing and conching viscosities can be maintained by using lecithin, and to a proportionate extent omitting the unnecessary poundage of cocoa butter.

This, in terms of finished chocolate, increases the output of mixers and conches per machine-hour. Reason for this is that the omitted cocoa butter need not be added until after conching is completed.

When lecithin is used in either of these two ways, it must be remembered that a good portion of its viscosity-reducing properties is dissipated by the time the coating is finally ready for molding.

Insofar as final viscosity is concerned, 1 oz. of lecithin added at the mixer or at the conch is worth about ½ oz. of lecithin when it is added after conching has been completed.

Several hours of valuable conching time are lost at the start of the process because it takes that long for the conch to break down the coating to the fluid condition necessary for proper conching action. An ounce or two of lecithin added to each 100 lb. of coating at the start of conching will rapidly break down the coating to its proper fluidity. As a result, conching effects will become noticeable several hours earlier.

The amount of lecithin that should be used for chocolate products varies, depending upon circumstances. Ordinarily, if full advantage is to be made of the lecithin, 4 oz. should be used for 100 lb. of dark chocolate coating. For 100 lb. of milk coating or light sweets, approximately 5 oz. of lecithin should be used.

These additions are made on the assumption that no lecithin was used either during mixing or conching. If lecithin has been added at either or both of these points, the total amount should approximate the 4 and 5 oz. mentioned, less about one-half the lecithin added at the mixer and/or the conch. While these amounts **are not** the absolute maxima, they are considered the "point of diminishing returns" under normal market conditions.

With the price of cocoa butter as high as it has been, quantities of lecithin even greater than those mentioned may be found economical. There is no set rule that can be applied for determining the maximum amount of lecithin that can be used, because of the many variables governing the final viscosity in chocolate products. If it is necessary to take full advantage of lecithin during periods of high cocoa butter prices, viscosity curves should be run on each coating.

Thus, it will be possible to determine the point at which a dollar's worth of lecithin ceases to do more work than a dollar's worth of cocoa butter.

Uniform Coating Coverage

The extent to which lecithin should be used will also be determined by the intended application of the coating. Suppose, for example, a confectioner wants to use the same coating on two or three different centers of varying sizes and shapes, and suppose he wants the same percentage of coverage of coating on all these centers. Obviously, no one coating will do this, unless its viscosity is changed in accordance with the shape and size of the centers.

Under such conditions, the chocolate manufacturer will frequently obtain the standard viscosity of the coating with perhaps only 2 oz. of lecithin per 100 lb. of coating. The coating can then be used "as is" on the center from which the coating drains most easily in the enrober. For smaller and flatter centers, the confectioner can then add more lecithin to the coating

before tempering. Thus, the viscosity of the coating will be reduced so that all centers will have the same percentage of coverage.

It is obvious that the confectioner wishing to use lecithin in coatings should find out from his chocolate manufacturer the amount of lecithin already used in the coating—or he should submit a sample to his lecithin supplier, who in turn will determine the amount of lecithin to add.

If moisture gets into coatings, either through contact with damp atmospheres or by accidental means, additional lecithin is needed. As a good example, consider ice cream coatings, into which moisture invariably finds its way while ice cream bars are being dipped. As a result of this moisture contamination, there is an increase in the viscosity of the coating, which can be minimized by using 8 oz. of lecithin to 100 lb. of ice cream coating, instead of the 4 to 5 oz. normally used.

Where moisture is introduced into confectionery coatings by any means, the original viscosities can be maintained by adding small amounts of lecithin. The amount required will vary with the quantity of moisture.

Frequently the confectioner may need lecithin in the enrober when his coating has thickened because: (1) Starch is washed from the centers into the stream of chocolate, (2) temporary loss of proper temper occurs, or (3) moisture from the centers is introduced to the coatings.

In any of these cases, the coating can be thinned by putting 1 or 2 oz. of lecithin into the enrober pot. After the lecithin is added, the belt carrying the centers to the enrober should be stopped momentarily to permit the lecithin to be dissolved and thoroughly mixed in the coating.

By adding 0.5 to 1.0 percent lecithin to sweetened cocoa powdered milk drinks, balling will be reduced and reconstitution hastened.

Lecithin is added to confectionery products other than chocolate to disperse fats, not to save them as is the case with cocoa butter in chocolate. The fat in certain confectionery centers is rarely, if ever, the main component of the confection. Use of lecithin in such fat-containing confectionery centers can best be illustrated by separately considering its application in caramels, toffees and brittles, and fudge.

Caramel Fats Uniformly Dispersed

If caramels were to be made without fat, while still avoiding stickiness, it would be necessary to cook them to so high a temperature that they would become extremely tough, if not altogether hard. For this reason, as well as for flavor, fats are always added to good caramels so that they will be soft, tender, and free from stickiness.

Since caramels are a water-base product, there is a high interfacial tension between them and any added fats. Good dispersion of the fat in the caramel is, therefore, difficult to obtain. However, when lecithin is added to the extent of 1 percent of the weight of the total fat content in the finished caramel, the interfacial tension between the fats and the caramel is reduced. Consequently, the fats are more uniformly dispersed.

When you cook a batch of caramel, you can see small pools of fat floating on the top. Then, if you add lecithin, in the quantity indicated above, to the batch while it is cooking, the pools of fat will quickly disappear and remain dispersed. Likewise, after the caramel has cooled, its surface is considerably more free of fat than when lecithin is not used, indicating that the fat has been bound inside the caramel.

Furthermore, because lecithin is an anti-oxidant, it will extend the shelf life of caramels by retarding staleness and rancidity.

Toffees and Brittles

In fat-containing toffees and brittles, the same dispersion problems are met as in caramels. Here, too, lecithin assures a complete and permanent dispersion of the fats, thus preventing the formation of a thin greasy layer on the surface of the candies, where it oxidizes and rapidly turns stale.

Good fat dispersion also results in more tender toffees and brittles, with less fragility than is customary. This seems paradoxical, but there is a logical explanation: When toffees or brittles break, it is at their weakest point. When you eat them, however, they are only as tender as their toughest point. These areas of alternating fragility and toughness occur because the fat is not completely dispersed. When the fat is completely homogenized, alternating tender and tough spots are absent, breakage at weak spots is reduced, and the candies are more tender.

As in the case of caramels, lecithin also retards staleness and rancidity in toffees and brittles.

Smoother Fudge

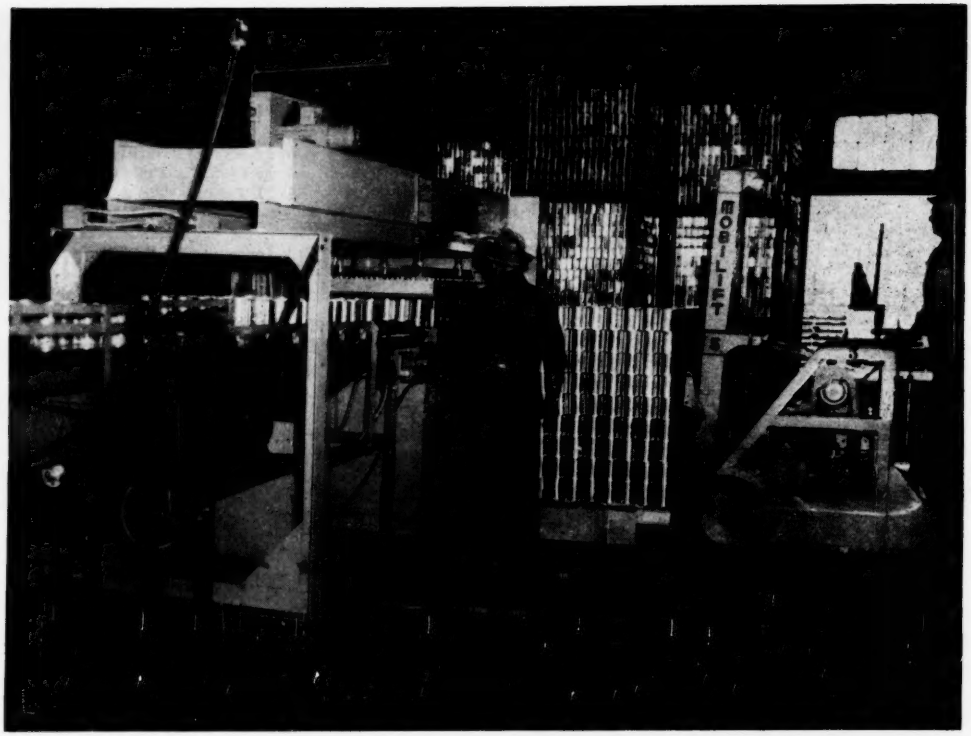
Fudges usually do not present any problems of stickiness or fragility. Nevertheless, adequate fat dispersion does assist in making a smooth fudge. This does not mean that the mere use of lecithin will result in a smooth fudge, since too many other factors enter into the production of a fine crystal structure. All things being equal, the addition of lecithin to the extent of 1 percent of the weight of fat in the fudge will result in a finer crystal structure and a smoother fudge.

Furthermore, since lecithin dissolves partly in the fat and partly in the water present in the fudge, it binds them together and delays drying. Thus, the shelf life of fudge is extended from a standpoint of flavor-freshness and dryness.

In fact, even before the fudge becomes too dry to eat, such losses in moisture cause crystal growth, which turns the fudge sandy. By retarding this moisture loss, lecithin aids in maintaining the same smoothness in fudge that it had originally.

Still another use of lecithin: Addition of 4 oz. to 100 lb. of ice cream mix speeds up and improves the dispersion of the mix when added at the pasteurizer. The lecithin also will reduce the accumulation of chocolate lumps on strainers.

LECITHIN added to coatings in enrober corrects any possible thickening.



OPERATOR of lift-truck places pallet load of bright cans on roller conveyor from which operator of Magnalift will manually shove the pallet into the elevator chamber. When actuated, magnet will lift cans ¼ to ½ in. to its face. Magnet (seen at left of operator's shoulder) shuttles along overhead rails (left) when transferring cans.

Magnetic Lift Speeds Can Handling, Reduces Losses

Simply controlled machine eliminates a tiring manual task, increases production, lowers operating costs, and reduces product losses

THROUGH advanced food plant engineering, the Mor-Pak Preserving Corp., Stockton, Calif., has eliminated the backbreaking job of transferring bright cans from pallets onto the labeling line.

Formerly requiring four men, this operation is now accomplished by one man—using a special magnetic lift. Not only has this new equipment evidenced savings in labor costs but it has already doubled production on labeling and casing lines, and further increases are indicated.

The old system produced 300 cases of labeled cans per hour (as calculated on basis of 8 months' operation in the warehouse, 5 days per week, 8 hours per day). The four men needed to transfer the bright cans onto the labeling line were each paid $1.25 per hour, which for the 8-month warehouse operation totaled $6,720. This labeling-casing operation also required six men for the following jobs: Forklift, 1 man; unscrambler, 1; labeling machine, 1; caser machine, 2; and 1 man at the end of the casing line.

This meant a total of ten men for the complete operation at a total cost of $16,800.

Manpower Reduced

But using the new magnetic lift and increasing the total capacity of the line from 300 to 600 cases per hour, the company estimates that it will accomplish the labeling and casing job in one-half the time formerly required. The company has eliminated three men and, in the coming season, will eliminate a fourth—the man now working at the unscrambler. This will bring the total cost of the operation down to $5,040—a savings of $11,760 annually.

There are other plus-factors arising from this new mechanical handling device. While the company estimated that under the old method it produced 300 cases of labeled goods per hour, it was known that as men tire they slow down on such jobs. In actually clocking the production of this line, it was found that the men would begin the day by feeding sufficient cans to the line to produce 300 cases per hour. But this rate gradually decreased until, at the end of the day, the men were so tired they were handling only about 200 cases per hour.

The company also reports that far fewer cans are dented with mechanical handling. (Tired men frequently drop

cans—sometimes as many as every other one at the end of a busy day.) Other indirect savings include some overhead costs, warehouse electricity, etc. Magnalift operations have so reduced pile-up of unlabeled cans that an extra warehouse and the expenses of trucking, loading and unloading have been dispensed with.

Operation Is Simple

It does not require an experienced man to operate this equipment. The controls are so simple that a new operator can be trained in a few minutes. Here is the procedure: The forklift operator keeps a pallet load of cans always available on the roller conveyor just outside the elevator chamber (each 32x43 in. pallet holds nine layers of cans—87 No. 2½ cans per layer, giving a total of 783).

Pallets are pushed into the chamber, when needed, by the operator of the magnetic lift. He then actuates the elevator, which rises automatically and is halted by an electric-eye when the top layer of cans reaches the magnet pick-up level. The operator then switches the magnet on, and cans jump the gap to the face of the magnet. He then moves the shuttle lever, and the shuttle carriage with the magnet and its load of cans moves away from the pallet and over the belt conveyor that feeds the unscrambler.

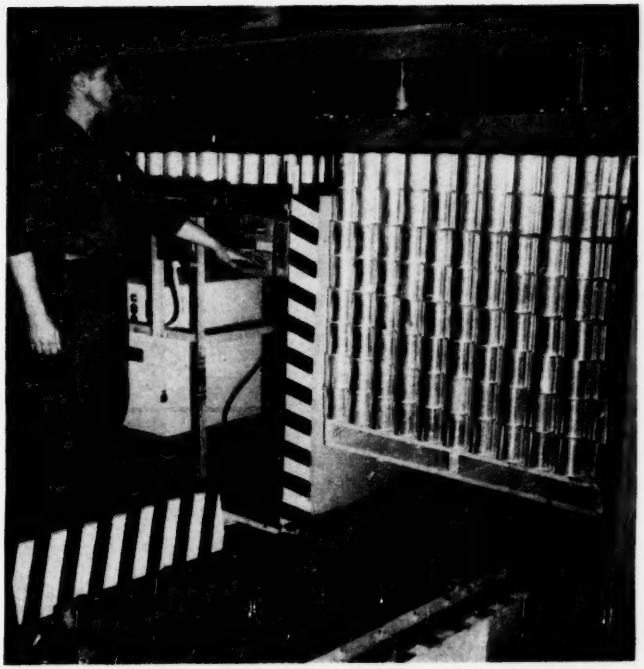
Automatic Controls

Limit switches automatically (a) open circuit to carriage motor; (b) de-energize magnet, which releases cans, dropping them about ¼ in. to the belt feeding the labeller; (c) power-brake the carriage motor; (d) reverse the shuttle, sending it back to starting position over the pallet load of cans; and (e) power-brake the carriage motor over the pallet.

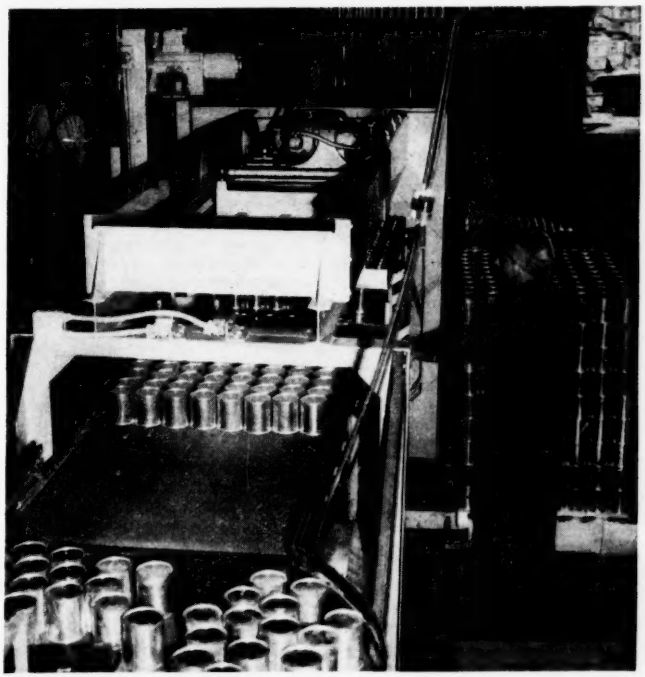
After the first layer of cans has been removed from the pallet, the next is raised to the magnet pick-up level while the shuttle is returning. The operator removes any cardboard spacers from between the layers of cans before the magnet is energized. When the last layer of cans has been removed from the pallet, the elevator controls are reversed and the empty pallet descends to the roller conveyor, where it is removed.

Time required for a full shuttle circuit is 11 sec. When the line is operating smoothly, the operator transfers a layer of cans from the pallet to the belt every 15 sec. It requires only 3½ to 4 min. to unload one pallet and begin on another.

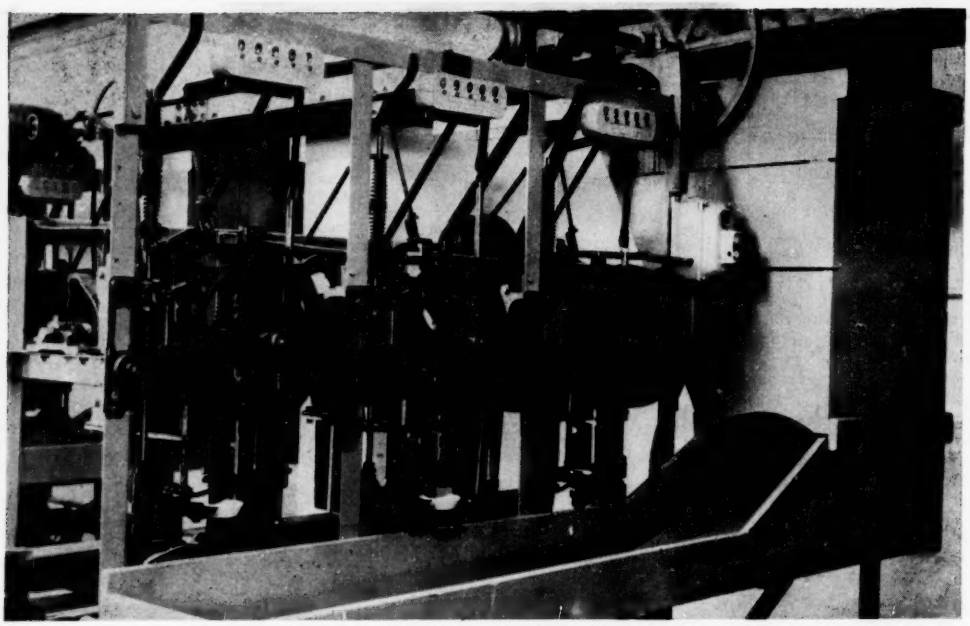
The Magnalift is manufactured by The Technalectric Co., Division of Joseph Wagner Mfg. Co., San Francisco, Calif.



CLOSEUP of magnet engaging top layer of cans. At left is layer just transferred. Load in elevator chamber has been raised off roller conveyor.



MAGNET carriage and its motor can be seen between the two beams (center background). Belt conveyor is moving layer of cans toward can unscrambler.



BLACK brings gears and wheels "forward"—delineating operation of this apple peeling machinery in the Knouse Canning Co. plant, Peach Glen, Pa. Focal orange gives attention value to counting devices (top) and control box (right). Green, on frame, hopper and table is "receding" color for eye-rest. Feed receptacles are in focal yellow.

Choose the Proper Colors—And Raise Plant Efficiency

How hues can speed work, reduce eye fatigue, banish hazards, lighten loads, and even "cool" hot rooms is demonstrated by practical science of color dynamics

WILLIAM F. OTTO
Color Consultant
Pittsburgh Plate Glass Co.

Improved production, higher employee morale, better sanitation, elimination of hazards, and reduced maintenance—all these are possible through the use of proper color schemes in the food plant.

Outstanding work in the field of color in the past few years has brought the realization that color is a specific, and that as such it can be employed in a processing plant in much the same manner as other implements or working tools. In short, the choice of color patterns should get as careful consideration as the quality or durability of the paint.

No longer can protective or aesthetic aspects be the only criteria of a paint. Rather, the actual effect of colors on people must be taken into account. In the modern application of color, the inherent energy of each hue should be employed to control emotional reactions, to help safeguard workers, and to provide maximum efficiency and comfort in man-made structures.

When paint is chosen strictly on a save-the-surface basis, the resulting color schemes are often depressing to employees. Such unfavorable color schemes also rob plants of available illumination, thus creating substandard seeing conditions at the working level. More than this, injudiciously used colors can impose unnecessary maintenance burdens and constitute actual physical hazards.

From the very nature of the work done in a food processing plant, sanitary conditions assume a vital role. In the past, the drive toward maximum sanitation was sparked by extensive use of white paint. With a "hospital" approach, white was used because it seemed to create an "antiseptic" atmosphere.

As a result, when a man walks into the production rooms of many large food processing plants today, the inevitable white—on walls, ceilings, machines, equipment, and worker uniforms—reduces the opening of his eye pupils, causes rapid blinking, and definitely induces fatigue. The sensation is similar to his eye reaction when he emerges from a darkened theater into a sunlit street.

As for his psychological reaction, he tends to think of hospitals, anesthetics, and disinfectants. This particular reaction was demonstrated recently when an airline painted one of its ships white as an experiment. People shied away from it because it reminded them of a hospital.

Tip for Food Processors

We hasten to say, however, that during the past few years hospitals have been forsaking the use of white and adopting colors that not only impart a sanitary air but also are pleasant and restful to the eye. Taking a tip from this trend, the food processor can achieve considerable improvement in his working areas.

There are several colors that can be

used in food plants to impart the aura of cleanliness and purity without the "negative" effect common with white. Such colors include various greens, blue-greens, and blues, and a host of other pastel shades. In nature, life, sparkle, and purity are indicated by these shades. What, for example, looks more refreshingly clean than the limpid green depth of a lake, or the swirling green of a mountain stream? The deep green of field and forest is both beautiful and refreshing, and the wide expanse of the blue sky is inviting and restful.

When used for the interior of a food plant, these colors perform several practical services. They provide eye-rest surfaces for employees and thus reduce fatigue—with a consequent improvement in production. The use of green is especially desirable in a food plant, inasmuch as it is naturally a warm place to work and the use of this "cool" color will assist in making the area seem cooler.

Employment of cool colors in warm areas is but one of many color factors that can help increase efficiency and comfort in various types of plants. This new science considers color on a functional basis to produce many definite, desired results.

Principles of Color Dynamics

The scientific uses of color are designated, vividly, as color dynamics. These principles comprise a practical formulation of a series of tested facts about colors.

The growing understanding of color is in marked contrast to its casual acceptance in the past. Previous to the past decade, which saw the development and formulation of the principles of color dynamics, color was assumed to be a part of structural makeup or finish. Little conscious planning was given to its use other than in an aesthetic sense to achieve a color harmony in homes, stores, and similar places.

In plants and factories, practically no regard was given to color. Emphasis was almost entirely on the use of paint as a protective element. In laboratories and schools, a dull brown paint was common on the walls, largely because it was thought more serviceable.

That a pleasant shade of green could have been used was seldom considered. Yet, this color would not only prove as serviceable, but would also provide a refreshing eye-rest surface for the technicians and pupils.

Today, thousands of color applications in bottling plants, laboratories, and factories are demonstrating that proper painting can mean the difference between average and efficient operation. Color engineers have shown that correct shades and hues point the way to lowered maintenance and upkeep costs.

Time and again, correct color use has shown the natural relationship that exists between color and light. It has been established that color is an indispensable accessory to proper lighting and an economic method for obtaining maximum illumination efficiency. These and other facts are based essentially on the knowledge that color has characteristics that can be used specifically. And so, color is being used today in the same manner as any other production factor.

Research Extensive

The principles are established upon the fact that color, a neighboring member of the infrared, ultraviolet, and x-rays of the electromagnetic spectrum, has inherent power and energy. All colors travel in the form of light, as waves of definite length—at the constant speed of 186,000 miles per second. This gives some indication of the staggering number of waves of color that enters the eye in 1 second.

It is reasonable to assume that this constant and rapid bombardment of waves entering the eye would involve an actual power of stimulus. This would naturally affect the physiological processes and the psychological sensations. The effect of this bombardment has been observed in changing blood pressure, muscular action, mental and nervous activity and mood of subjects.

The difference in the wave lengths of color, the peculiar construction of the human eye, and the disposition of certain surfaces to reflect or absorb different colors, give rise to many unusual problems concerning color.

Consider, for instance, the eye's reception of impressions of yellow, red, and blue. When the eye is fatigued by any one of these colors, it is incapable of seeing white light, since white is composed of the total of all colors. Being blinded by the rays of one color, the eye then sees only the total of the remaining colors. Thus, if the eye is fatigued by constant concentration on red and the gaze is then shifted to white, it will see green, which is red's complementary color formed by the colors blue and yellow. If a combination of complementary colors (and each color has its complement) is used in a color scheme such as blue-green on a background of red, there will be vibration—producing eye fatigue.

In what is known as brightness contrast, the same color on different backgrounds will appear in different intensities. For example, an orange circle on a background of red will appear more red than the same orange on a background of green.

Other less spectacular but none the less essential facts are also now known about color. Engineers, for example, found that some colors having a high reflection value (such as white) can actually cause a lowering of visibility. Other colors, with less reflection value, such as vista green and suntone, were revealed to have the power of properly dispersing illumination and achieving maximum ease of seeing.

As indicated, some colors (yellow, orange, red) have the power to make a person feel warm, while others (violet, blue, green) have the effect of making him feel cool. By association, blue sometimes creates a feeling of depression, and red is sometimes irritating. On the other hand, yellow can stimulate warmth and orange cheerfulness.

Certain colors when used scientifically in a prescribed pattern can alter visually the proportions of any area in a plant. By recognizing and employing these characteristics, color engineers have directed them to productive goals. In the principles of color dynamics, they have established a tested medium for creating ideal environments, at the same time making it possible to effect better seeing and better housekeeping.

Application to Equipment

The use of various colors in food processing plants can be scientific and correct by following the principles of color dynamics. Basically, these principles seek to improve man-made surroundings by adapting the color harmonies found in nature's pleasant color combinations.

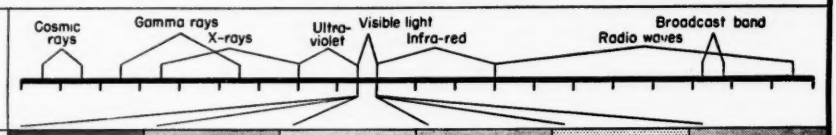
The first job of color is on machinery and equipment — to distinguish the critical from the non-critical parts. This is done by giving the critical or moving parts a color that comes quickly to the eye—a color that moves "forward" in strong contrast to the stationary or non-critical parts. Known as "focal colors," these hues include focal ivory, buff, light green, blue, yellow, beige, red and orange.

The primary purpose of focal color is to focus the workers' attention exactly. As the critical parts of the machinery or equipment must move "forward," the non-critical areas must drop "back." The widely used white does exactly the opposite—for when painted gleaming white, the bulk of machinery and other equipment completely fills the employees' vision.

After careful study and research, it has been found that a receding color known as vista green accomplishes the task best. No other color has such a relaxing and soothing effect upon the

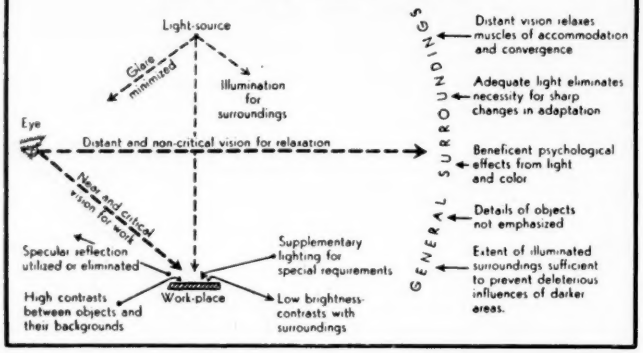
Color Traits, Fields of Use, and Factors in Lighting of Work

CHARACTERISTICS OF PRIMARY AND SECONDARY COLORS FOR FUNCTIONAL USES



Visible spectrum	Violet	Blue	Green	Yellow	Orange	Red
Wave length	17 mil. of 1 inch	19 mil. of 1 inch	20 mil. of 1 inch	22 mil. of 1 inch	25 mil. of 1 inch	30 mil. of 1 inch
Type of color	Cool	Cool	Cool	Warm	Warm	Warm
Complementary color	Yellow	Orange	Red	Violet	Blue	Green
Primary associations	Rich-formal-luxury-royalty	Cool-remote-calm sometimes depressing	Warmth of yellow-coolness of blue-nature refreshing	Sun warmth stimulating	Brilliance-cheer-visibility	Danger-fire-sometimes irritating
Therapeutic value	Calms the mind-quiets the body	Reduces muscular tension	Calm peaceful effect	Stimulating-overcomes depression	Partakes of nature of red and yellow	Stimulating effect

Role of Color in Lighting Work-Places


Light-source
Glare minimized
Illumination for surroundings
Eye
Distant and non-critical vision for relaxation
Near and critical vision for work
Specular reflection utilized or eliminated
Supplementary lighting for special requirements
High contrasts between objects and their backgrounds
Work-place
Low brightness-contrasts with surroundings
GENERAL SURROUNDINGS
Distant vision relaxes muscles of accommodation and convergence
Adequate light eliminates necessity for sharp changes in adaptation
Beneficent psychological effects from light and color
Details of objects not emphasized
Extent of illuminated surroundings sufficient to prevent deleterious influences of darker areas.

These Are Major Categories for the Use of Color

- ***Symbolical*—Association of products and functions with specific hues.**
  1. **Identifying materials and equipment. Despite fact that color symbols have long been employed in food operations, modern ramifications of these technics have opened the way to numerous industrial innovations.**
  2. **Speeding production by color codes, particularly for materials.**
  3. **Improving decorative schemes.**
- ***Psychological*—Use of color to create advantageous optical illusions.**
  1. **Minimizing the effect of weight or bulk.**
  2. **Making what appear to be changes in the physical proportions of areas, or visually eliminating undesirable structural features.**
  3. **Making apparent changes in temperature in working areas by skilled use of "warm" or "cool" colors.**
- ***Physical*—Pertinent uses of colors for effect as brilliant or dull, glaring or non-glaring, strong or weak.**
  1. **Inducing orderliness and cleanliness in working areas.**
  2. **Reducing eye strain and body fatigue.**
  3. **Eliminating specific hazards.**
  4. **Minimizing illumination costs and maintenance.**

BASIC GUIDES for employing color are collated above. Lighting chart (center), indicates how colors can be utilized to aid the eyes in performing their tasks with the minimum use of energy and maximum muscular relaxation.

human eye as the receding vista green.

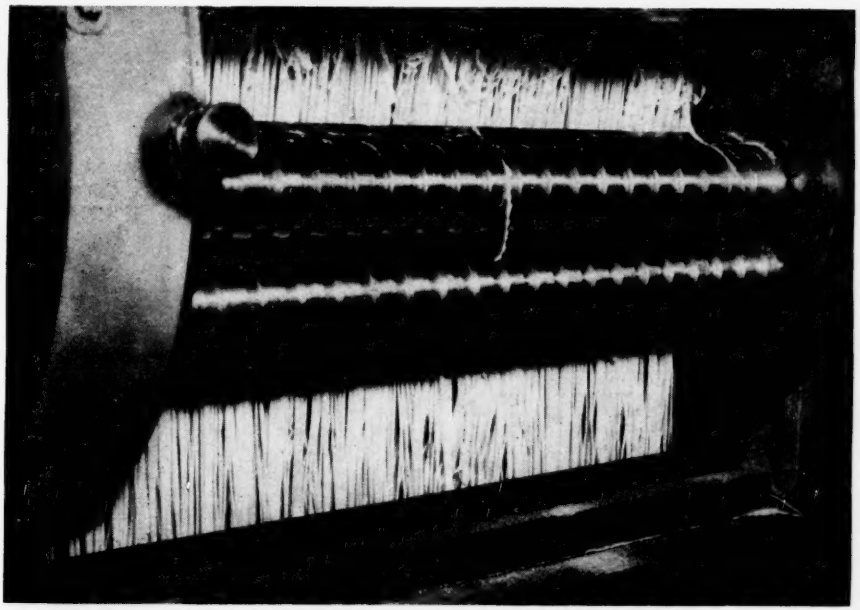
Various other colors have been developed suitable for treating walls, ceilings, and other surfaces of food plants. Among these is cascade blue, used ordinarily on ceilings to appear to make them recede. Another is a shade of green possessing the same qualities as vista green but less intense. This was developed for wall areas. And for areas where there is an absence of natural illumination or where there is too much northern exposure, a special shade of yellow called suntone has been developed.

Vision Angle Important

In the food plant having modern machinery and equipment, the vision angle is becoming a vital consideration. As further mechanization takes place, the need for close observation of control areas, levers, and dials grows increasingly important. Thus careful attention should be given to the proper color schemes of equipment. For intance, the operator of modern flour handling equipment is constantly using his eyes to watch the units that control the blending, cleaning, aerating, and weighing of the flour. Anything which eases this task will naturally assist in controlling the quality of the product.

If the body of the equipment is finished in eye-rest green, it affords a non-irritating surface upon which the operator can rest his eyes. The area where the flour is introduced, the hopper, and other essential parts, could

(*Turn to page* 116)



CLOSEUP of egg noodles coming from cutters. The long strands were later recut for use in soup mixes.

NOODLE PROGRESS

Continuous mixer-sheeter, integrated with an automatic proportioning machine, produces more uniform noodle products than the batch method. Rate is 1,600 lb. per hr.—with minimum supervision and floor space

JAMES J. WINSTON
Chief Chemist, and

BENJAMIN R. JACOBS
Director
Jacobs Cereal Products Laboratories, Inc., N. Y. C.

Through the use of a continuous doughmixing and sheeting machine, annual U. S. production of egg noodles has increased from 130,000,000 lb. prior to 1941 to approximately 200,000,000 lb. to meet present demand.

This machine was developed after intensive studying, designing, and engineering. It combines all the operations employed in the older batch process but on a continuous basis, with constant flow of a sheet of dough that is uniform in color and texture.

Working integrally with the mixer-sheeter, a proportioning machine feeds the ingredients automatically and in the correct amount, thus making the continuous method of manufacturing egg noodles practical.

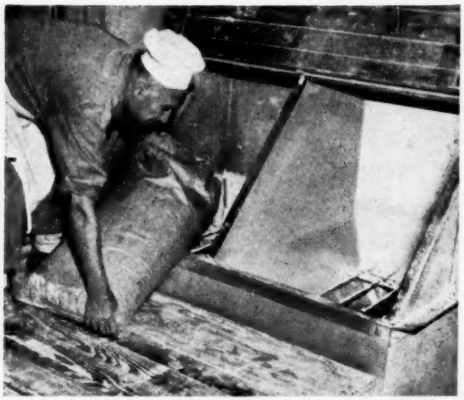
In the continuous system, the farinaceous ingredients (usually durum flour), egg yolk or whole egg, and water are automatically fed into the mixer. The mix then passes through a series of rollers that knead the dough and roll it into a smooth, bright sheet of the required thickness. The noodle sheet then travels into the cutter, from which noodles are automatically conveyed into the continuous noodle drier.

The continuous sheeter, which was developed by Clermont Machine Co., Inc., Brooklyn, N. Y., will find other applications in the food industry. For example, it is now being redesigned to speed rolling and smoothing dough in the manufacture of matzos.

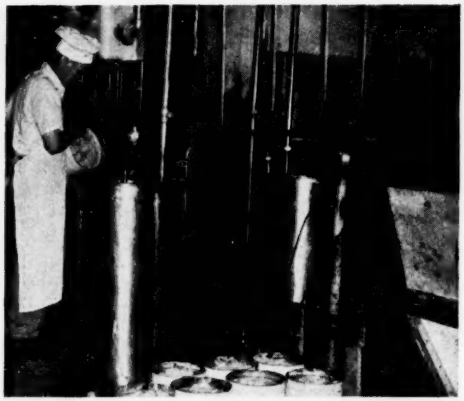
Composition of the Noodles

Egg noodles, for which there is a Federal Standard of Identity, must contain not less than 5.5 percent egg solids, on a dry basis. This amount is obtained by the addition of either 11.1 lb. of egg yolk (with a solids content of 45 percent), or 20 lb. of whole egg (with a solids content of 25 percent) for each 100 lb. of flour. This egg solids' requirement is equivalent to the addition of two eggs per pound of flour—the amount commonly used by

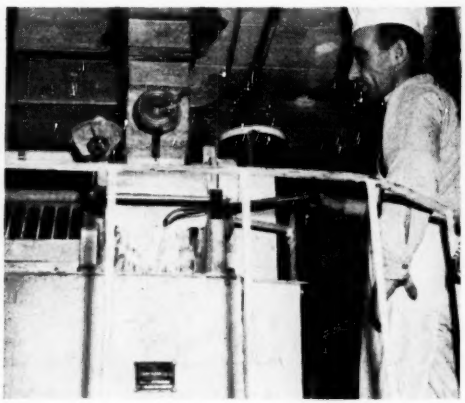
Continuous Noodle Unit Feeds Ingredients, Mixes Them, and Sheets Dough



1 **FLOUR** is dumped into hopper feeding tube that takes it to automatic feeder on sheet-forming machine.

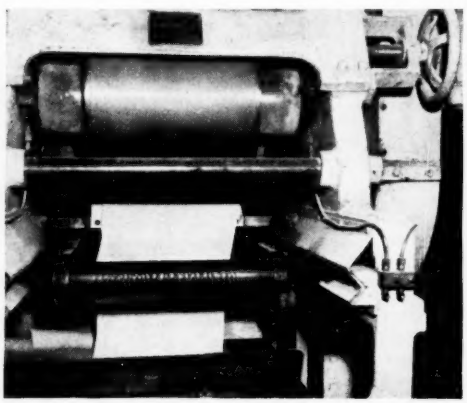


2 **EGG MIX** is prepared in stainless steel tank (left), then pumped to reservoir. Latter feeds it to mixer.

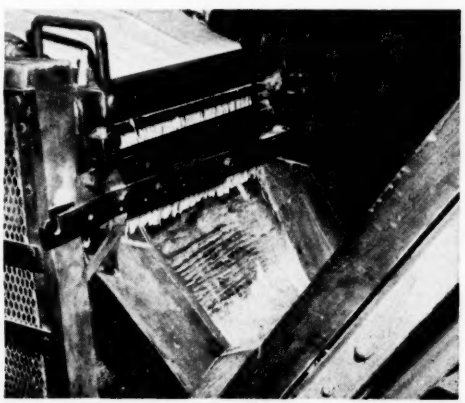


3 **CONTINUOUS FLOW** (center) of egg-water mix and flour into mixer. Feed is regulated by dials (top).

4 **MIXER**, equipped with horizontal shaft containing paddles, continuously blends mix into a smooth dough.



5 **DOUGH** goes through three series of rollers that form it into 1/16-in.-thick sheet. Later, it is wound on a spool.



Photos Courtesy A. Goodman & Sons, Inc.

6 **SHEET** (top left) is fed to unit that slits and cuts it to size. Noodles are then conveyed to preliminary drier.

the housewife before the commercial production of egg noodles became popular.

Also, the enrichment of egg noodles (optional under the Federal Standards) is accomplished by the use of a Wallace & Tiernan N-A mechanical feeder, which is already used to a great extent in the milling industry. The wafer method, used by the baking and macaroni industry, has been adapted to the older batch system of manufacturing egg noodles.

Continuous Compared With Batch

The continuous system, which utilizes the automatic mixer and sheeter, was developed to produce a product of uniform color, texture and consistency with minimum supervision. At the present time, this system is responsible for about 70 percent of the industry's noodle production.

In the batch system, the quality of the product varies with the attention given by the operators. An operator may apply too much water in the mixing, or knead the dough too little or too much—either would have a definite effect in lowering the quality of the finished goods.

Furthermore, in operating the old dough breaker, sheets should be criss-crossed to impart more strength to the product. This step, which the operator finds burdensome, often would be omitted—to the detriment of the noodles. These factors cause a differential in the drying process and thereby there is required additional handling by men in the drying rooms to determine whether the products are sufficiently dry.

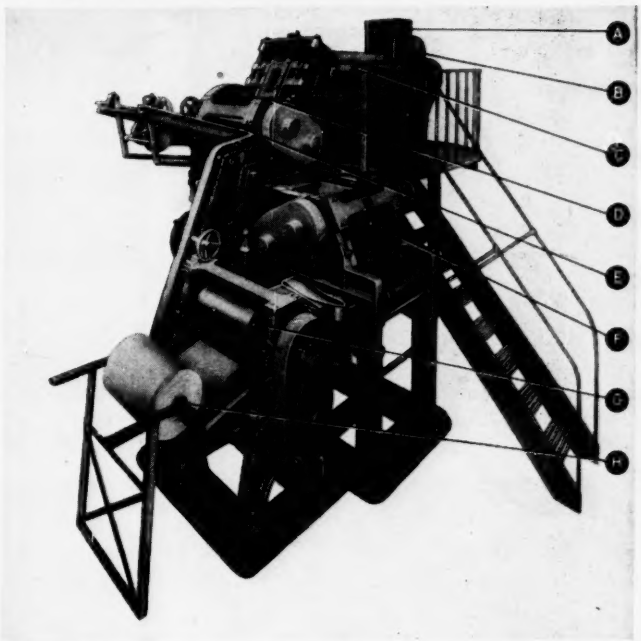
Also, the addition of egg yolk in the mixing process would often vary because of improper weighings. This will result in a product with either a too low or a too high egg solids content.

Floor Space Saved

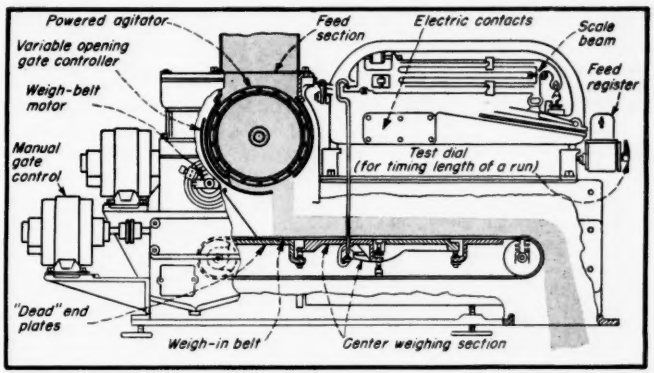
Another important advantage of the continuous sheet forming machine is that it permits increased production without requiring too much floor space. Therefore, the manufacture of noodles can be expanded without the need of additional floor space. The continuous noodle sheeter, which has a capacity of 1600 lb. per hr., can be run by one operator—thereby reducing labor costs. To meet smaller demands, the speed of the sheeter can be reduced, if desired, to a minimum of 600 lb. per hr.

It is to be noted that there is no handling of the dough or noodles by an operator during the entire processing, thus safeguarding the cleanliness of the product. Periodic chemical analysis of the finished dry noodles should be made to assure the manufacturer that his products comply with the Federal Standards of Identity for egg solids and moisture.

New Equipment Speeds Noodle Production



AUTOMATIC dough sheet-forming machine features: (A) flour-feeder valve; (B) egg-water-mix feeder valve; (C) dough mixer; (D) pusher that feeds dough into three series of rollers; (E) first series of rollers; (F) second series; (G) third series; and (H) automatic mechanism that winds dough-sheet on spool.



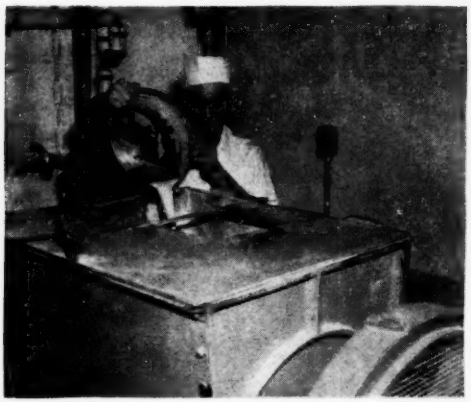
SCALE-FEEDER (shown schematically) has been adapted for continuous making of noodles. Ingredients are proportioned by weight into mixing unit.

Preparation of Eggs for Mixer

The sheeter has three series of rollers. It has a mixer and flour feeder on the platform, working in conjunction with the first series of rollers. The egg apparatus is below and to one side of the platform. Operation of the equipment is as follows:

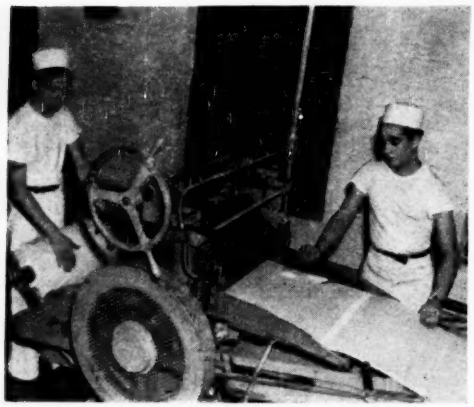
Five cans of egg yolks are put into a stainless steel egg-mixing tank. Then a push button, controlling an automatic water meter, is pressed to add the required proportion of water. When water and yolks are thoroughly mixed, another push button is pressed. A

Batch Method Requires Many Handlings, Results in Quality Variations

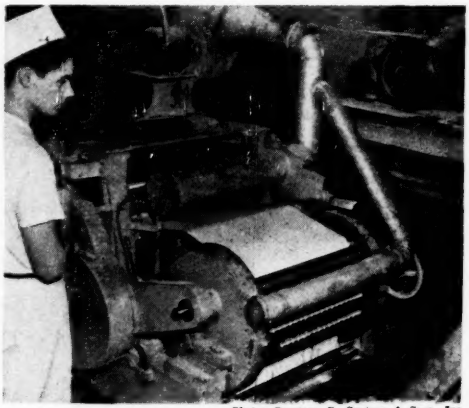


1 MIXER handles three batches an hour. Here, the required amount of flour, eggs, and water are blended.

2 KNEADER unit (right) works dough into smooth, texture. Dough is then cut and stored in boxes (left).



3 DOUGH-BREAK MACHINE rolls dough into sheets 3/16-in. thick. Winder collects sheet on spool (left).



Photos Courtesy G. Santoro & Sons, Inc.

4 CUTTER UNIT first rolls 0.04-in. sheet, then slits it into the noodle strips (also see closeup, page 91).

centrifugal pump then operates, drawing the mixture from the egg-mixing tank through a strainer to a stainless steel egg-storage tank. The strainer retains remaining particles of egg shell and skin.

Pumping is continued until the 100-gal. tank is full—an amount sufficient for several hours' run. This operation can be carried on while the sheet-forming machine is running.

The mixture is then pumped into a reservoir with an overflow that runs back into the same storage tank. Thus, a constant level and pressure are maintained to provide an even flow of the mixture to the dough mixer.

Flow of Flour and Eggs Controlled

On the flour feeder of the sheet-former, a dial graduated from 0 to 100, may be set for the quantity of dough in pounds per hour that the noodle manufacturer wishes to turn out.

The flow of the egg feeder is also regulated. Here, dial graduations range from 0 to 50 (this is in gal. per hr.). The operator sets the unit to provide a flow of egg-water mix which will be in proper proportion to the flour feed. This, of course, will provide a product which will comply with the requirement for egg solids' content.

As the ingredients flow into the mixer, they are continuously stirred so that a smooth, even mixture is formed. The mixer is equipped with a horizontal shaft containing paddles set at a 10 deg. pitch so as to convey the mix from the feed to discharge end. From the mixer, the dough goes through the first series of rollers. These squeeze it to a thickness of about ¼ in.

After this sheet is formed, a reciprocating device drops it to a lower conveyor in a zig-zag form. Then it enters the second series of rollers where it is squeezed to a thickness of ⅛ in.

Texture and Color Process

Then the sheet is again zig-zagged in preparation for the third series of rollers. This process of rolling and zig-zagging the dough sheet imparts a good texture and good color to the product.

As the sheet—now $\frac{1}{16}$-in. thick—leaves the last rollers, it can either be fed directly to a noodle cutter or it can first be wound on a spool prior to cutting. Fed from the spool the sheet may go either to a noodle cutter, a

folding machine, or a machine for stamping fancy products (like "bow-tie"-shaped items). The noodle cutter slits the sheet into one of five widths, varying from fine to broad.

Now, the formed noodles pass continuously through a preliminary screen drier. Then they travel directly through the finishing drier, from which they emerge ready for packaging. Time of the drying operation varies with the type of noodle produced—from 3 to 5 hours.

Batch Mixing and Doughing Steps

The batch system of manufacture requires a great deal of handling and manpower. Batch output accounts for about 30 percent of the total U. S. noodle production.

Here, the farinaceous ingredient is mixed with the required amount of egg yolk or whole egg and a suitable amount of water to make a firm, uniform, smooth dough. Generally, 20 to 24 lb. of water, ranging in temperature from 70 to 130 deg. F., and 11.1 lb. of liquid egg yolk are used for every 100 lb. of durum flour. The quantity of water varies with the product manufactured and the nature of the flour. Occasionally, a small amount of salt is added during mixing.

The batch mixer has a single drive shaft operating four propeller-type blades. Mixing time usually takes about 10 min. One man operates the mixer, making about three batches an hour. Each batch usually consists of 140 to 300 lb. of durum flour with the required amount of egg solids and water.

Kneading Operation

The dough is next transferred directly to the kneader, which primarily consists of a very slowly turning circular pan (up to 8 ft. in dia.). The lumps of dough are forced to move at the outer edge of the pan by means of a small plow. Two heavy corrugated conical iron rollers that idle upon the surface of the dough, work and crush the dough, forming a circular endless strip which is about 10 in. wide and 4 in. thick.

Kneading continues for 10 to 15 min., until the dough has assumed a homogeneous, smooth, stiff texture. Both the plow and the rollers may be adjusted to assure formation of a dough of the required smoothness. One operator can attend to two kneaders.

The Dough Break

Coming from the kneader the dough is cut into sections about 20 in. long. These sections are stored in a well-covered, stainless steel-lined box which prevents case hardening of the dough. Now, the dough is ready to be formed into appropriate sheets, later to be cut into noodles.

The dough-break mechanism consists of: (1) Two smooth, ground-steel rollers (7 in. dia.), with an operating width of 20 in.; (2) a trap door; (3) an inclined canvas belt that moves toward the operator; (4) a dough-sheet winding mechanism, and (5) a working table.

Four sections of dough are required to make a full spool of sheet dough. The operator first places two pieces of dough on the working table portion of the breaker. The rollers are opened 2 in. wide, and one slab is forced between the rollers at a time. This action flattens the dough to a 2-in. thickness.

With the trap door opened about 12 in. beyond the rollers, the flattened dough falls to the top of an inclined endless canvas belt. This action brings the pieces of worked dough back to the operator.

Now, the two sections of dough are put through rollers set 1 in. apart. Both sections run through the rollers at the same time, one on top of the other. The two sections of dough are thus formed into one sheet, which is then again forced through the rollers with the same setting. Then, the setting is reduced to ½ in. and the dough is sent through the rollers two more times.

Squaring the Dough-Sheet

On the second trip through the ½-in-set rollers, the irregular leading and trailing edges of the sheet are folded back (about 2 ft.) so that the edges are squared off. This sheet is set aside on the work table for several minutes until the other two sections of dough are rolled in the same manner.

When the second sheet is rolled to a thickness of ½ in., the rollers are set to ⅜ in., the trap door is closed, and the last sheet is forced through first. Now, the automatic winding mechanism collects the ⅜-in. sheet on a 20-in.-wide spool. When this sheet is about to run through the rollers, the first sheet is placed on top of the trailing edge of the sheet in process,

Fast-Flow Is Featured on This Continuous Line

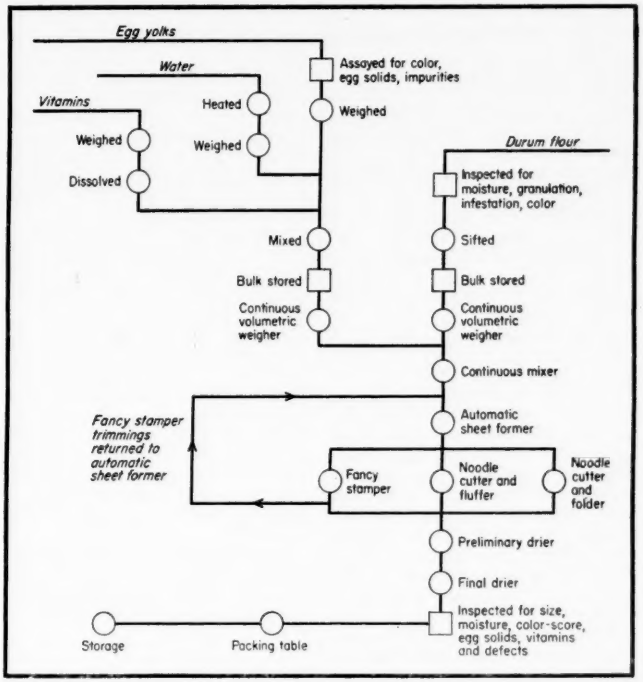


DIAGRAM shows continuous flow, from raw materials to egg noodles. Circles designate unit operations. Four of these operations are performed on one machine—the dough-mixer and sheeter described in this report. These four operations (shown separately above) are: Continuous volumetric weighing of egg yolks, water, and vitamins; continuous volumetric weighing of durum flour; continuous mixing; and automatic sheet forming.

forming the two into a single piece.

It generally takes about 5 min. to make a full spool of a noodle sheet that is $\frac{3}{16}$ in. thick and 14 in. in dia. and which will yield 100 lb. of dry noodles.

Noodle Cutter

Wound on the spool, the dough is ready for the noodle cutter—or for the stamper, should a fancy-cut item be desired. In the noodle cutter and the fancy stamper, thickness of the dough sheet is further reduced (in two sets of rollers) until it is 0.04 in. thick.

The sheet is then introduced between the cutting rollers, where it is shredded or slit into appropriate widths to meet the requirements. These strips or ribbons are cross cut from about ½ in. to 16 in., depending upon their uses. And they are either fluffed or folded by special attachments.

The noodles are then automatically spread on trays, and these trays are placed on flat trucks which are rolled into driers. Or the noodles may be air-conveyed directly to continuous automatic screen driers.

Standards of Enrichment

In 1945, at the request of the National Macaroni Manufacturers Assn., the Food & Drug Administration promulgated Standards of Identity for enriched egg noodles to parallel the enrichment of white flour and macaroni. The enrichment levels established require that each pound of finished noodle product contain thiamine, riboflavin, niacin, and iron in the following amounts:

1. Not less than 4 nor more than 5 mg. of thiamine (vitamin B-1).
2. Not less than 1.7 nor more than 2.2 mg. of riboflavin (vitamin B-2).
3. Not less than 27 nor more than 34 mg. of niacin.
4. Not less than 13 nor more than 16.5 mg. of iron.

Enrichment in Continuous System

Precision mechanical feeders—such as the aforementioned N-A feeder used by the milling industry to enrich flour —have been adapted to the continuous system. Before selecting an enrichment process and applying it in plant practice, the proportioning system must be carefully analyzed by a competent engineer. Otherwise, considerable waste of the materials is likely to occur.

The N-A feeder has stainless steel feed rolls and a non-arching hopper. The slow moving feed rolls deliver a ribbon of powdered enrichment-premix across a feed apron. By varying the width of the ribbon, changes can be made in the rate the premix is fed—this width adjustment being made by means of a simple graduated feed slide. The high and low range of feeding the enrichment material can be easily changed by reversing a pair of gears. A measured stream of enrichment concentrate falls from the feed roll and is applied to the main flow of farinaceous ingredients in either the conveyor system or at the head of the mixing chamber.

The mechanical feeder is efficient and reliable. With its use, vitamins and iron are uniformly distributed in the finished egg noodles. However, it is advisable to make periodic assays of the egg noodles to assure that the products comply with the Standards of Identity.

Flour and Water Scale Feeder

In the past two years, a scale-feeding machine has been introduced. This machine is adaptable for the continuous method of making macaroni and noodles. Continuous and accurate feeding of flour and water into the mixer has always presented a problem. This is due to the non-uniformity of the farinaceous material (flour or semolina). Non-uniformity may be due to the granulation and moisture content of the flour. It may also be attributed to changes in humidity. Such changes will affect the rate at which the flour is fed through a volumetric-type belt feeder, generally used in the industry.

The new Wallace and Tiernan Merchen Scale Feeder proportions material by weight rather than by volume. It is being used by some manufacturers to overcome the difficulties with the usual volumetric feeding.

This type of feeder is designed to add the proper amount of material at all times. It consists of a feed section equipped with: (1) An individually powered agitator to prevent arching and caking when feeding ground materials; (2) a variable-opening gate at the outlet of the feed section, regulated by an automatic gate controller actuated by the weigh-belt motor and by a manual gate control; (3) a weigh-belt that rides over "dead" end plates; and (4) a center weighing section which is in turn balanced by a scale beam for setting the desired rate of feed.

Electrical contacts are connected to the scale beam for actuating the gate controller and to a feed register and test dial for timing the length of any particular run.

Registers Material Used

Added features assist the operator in his job. The feeder will automatically stop and sound a warning device to let the operator know that everything is not quite right. Total weights of flour used over a period of time are also registered. Thus, an inventory can be kept of the material used. From this inventory, production and finished product figures can be calculated.

In addition, a water-flow regulator has been developed. It operates in synchronism with the gravimetric feeder. The regulator uses the principle of a fixed head of water over an orifice. The rate of flow is adjustable by positioning the orifice with relation to the fixed-water level in a controlled level chamber.

The regulator is different from most conventional types that use a throttling device, such as a valve in the line. Temperature regulators for the water ahead of the flow regulator are essential for the proper operation of this type of equipment.

Enrichment in Batch Process

The wafer method of enrichment which is used by bakers to proportion vitamin concentrates to batches of dough, was found applicable in the noodle industry. The wafers of enrichment material are generally square and scored into four equal sections. Each section will enrich 25 lb. of farinaceous material to comply with standards for the enriched noodle product.

The required number of wafers is added to part of the water used in the mixing process. These wafers form a uniform suspension within several minutes. The suspension is then added to the mixer with the necessary amount of water to make dough of proper consistency. The remaining operations are carried out in the usual manner, with periodic assays of the finished noodles to assure compliance with Federal Standards.

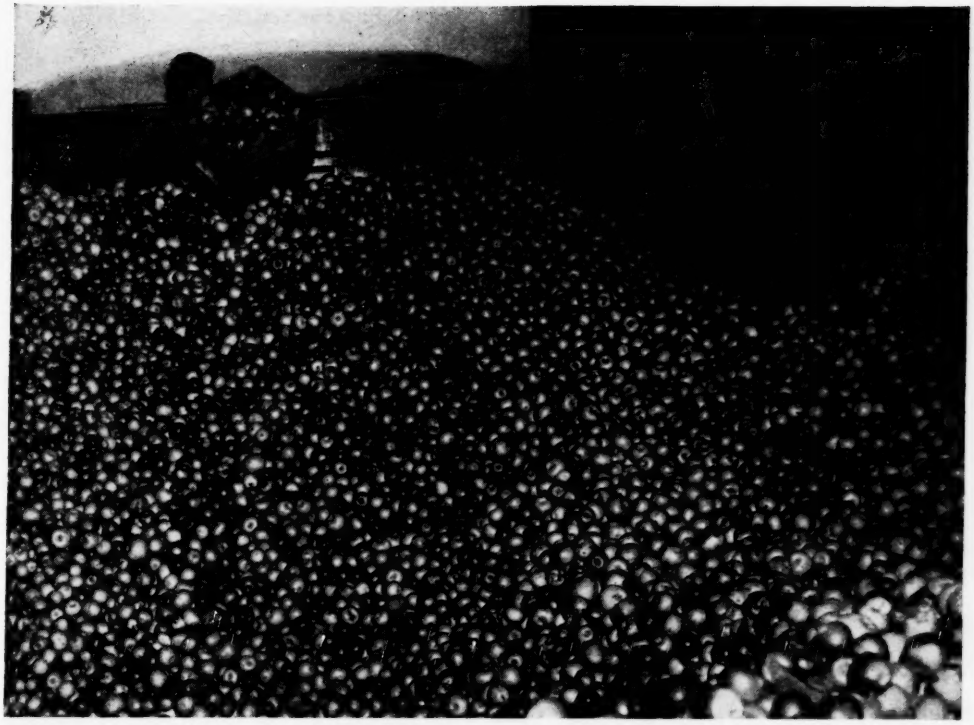
Types of Egg Noodles

There are many variations in size and shape of noodles depending upon their use. They may be fine, medium, broad, fluffy or folded.

In the past few years, owing to the demand from soup-mix manufacturers, a fine short-cut noodle has been envolved. Approximate dimensions of these noodles are 0.45 in. x 0.046 in. x 0.043 in. They require a special slitting and cutting device.

Acknowledgments

The authors wish to express their thanks for the cooperation of John Amato, general manager, Clermont Machine Co., Inc., Brooklyn, N. Y.; Vincent H. Marchese, assistant general manager, G. Santoro & Sons, Inc., Brooklyn, N. Y., macaroni maker; and Robert Cowen, vice-president, A. Goodman & Sons, Inc., Long Island City, N. Y., macaroni maker.



APPLES for juice must be carefully selected. They should be sound, thoroughly ripened and of the right varieties.

New Bottling Line Reduces Breakage, Cuts Costs

Installation in apple juice plant features novel unscrambler, infrared lamps for preheating cold bottles, and continuous three-stage cooler

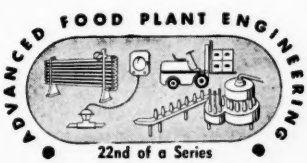
JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Labor costs have been cut more than one-half, bottle breakage is practically eliminated, and the amount of water used to cool bottles of pasteurized apple juice has been reduced two-thirds since the recent installation of a completely conveyorized bottling line in the plant of V. Tenedine & Sons, Inc., North Haven, Conn.

What's more, this company has found that the new automatic bottling line takes up only about one-half as much floor space, and it permits better plant sanitation than the old one. The line is arranged circle-wise. Thus, the bottles go continuously through filler, capper, and twister, then turn a U-curve at the end of the bottling room, and come back through the cooler to the rotary pack-off station, adjacent to the first unscrambler where they began.

Locating the pack-off station near the unscrambler equipment eliminates additional handling of empty cases. The operator who feeds gallon and half-gallon empties onto the unscrambler frequently has time to pack full goods into the same carton at the pack-off table.

Production on this one line has exceeded 5,000 gal. of apple juice a day. It was to handle this volume that Island Equipment Corp. engineers designed this modern, efficient bottle-conveying system.



Saves Labor

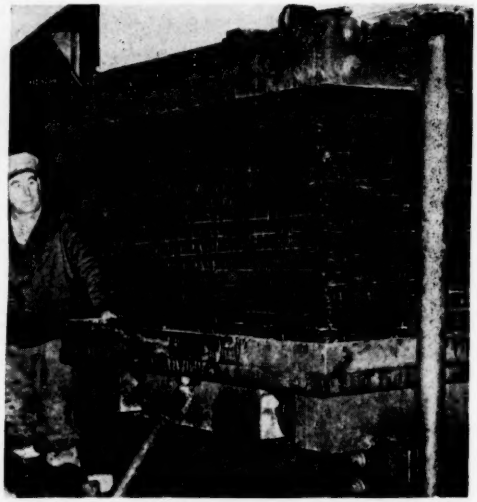
Installations that have cut labor costs and increased production include a straightline unscrambling table with a discharge conveyor, an automatic filling machine, a capper, and a hand-labeling machine. There is also a bottle cooler featuring continuous automatic feed and discharge, thus eliminating manual stacking of bottles for cooling.

Only four operators are needed on the new bottling line. This is in contrast to the nine workers required befor the conveyor was installed—a 55 percent reduction in labor. The pres-

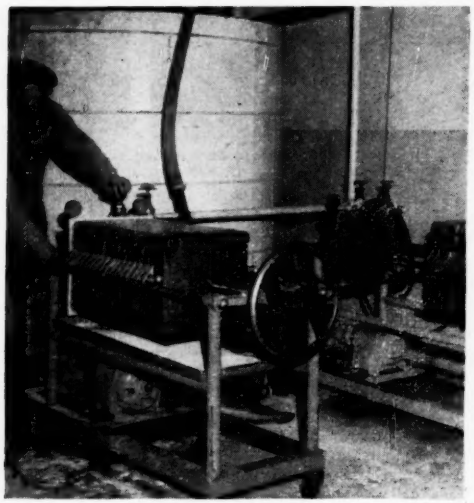
Text Continued on Page 100
Picture Story Follows

Apple Juice Is Pressed From Pomace, Filtered, and Pasteurized . . .

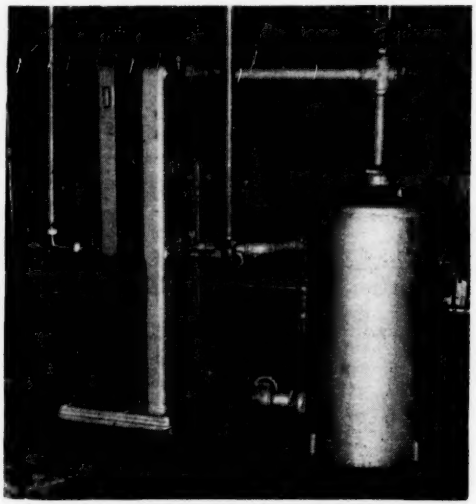
1 **BUILDING** the "cheeses". Crushed apples are filled into press cloths, supported by form placed on rack.



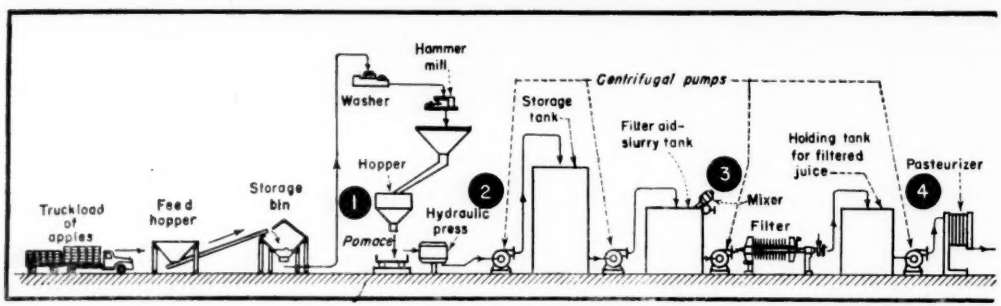
2 **HYDRAULIC PRESS** squeezes juice from apple pomace. Yield is 250 gal. of juice from 1½ tons of pomace.



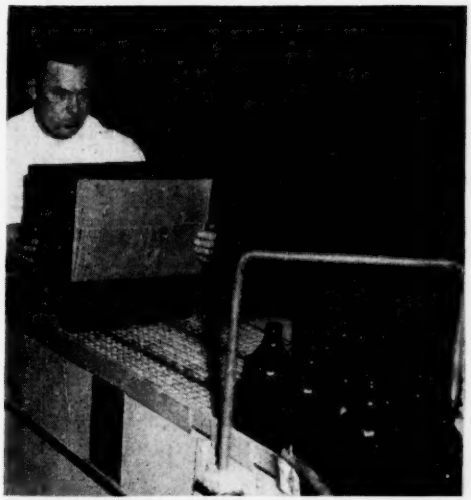
3 **FILTERING** Pectinol-treated juice through asbestos pads. Juice is first mixed with diatomaceous earth



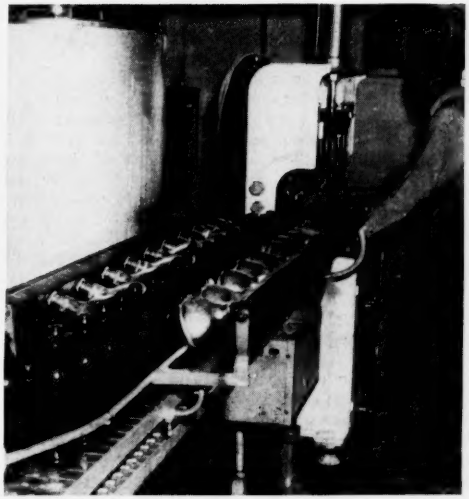
4 **PASTEURIZING** juice to 180 deg. F. in plate-type heat exchanger which has temperature control unit.



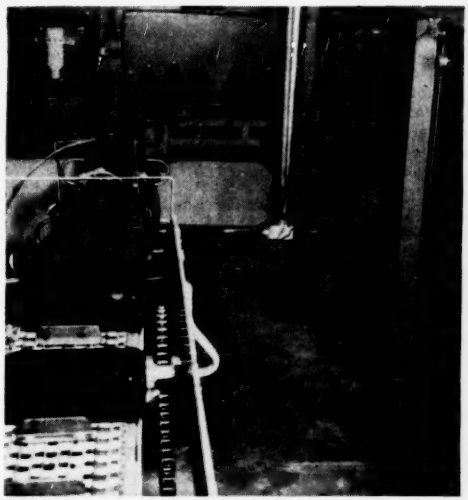
. . . Then Filled Into Bottles That Are Capped, Cooled, Labeled, and Cased



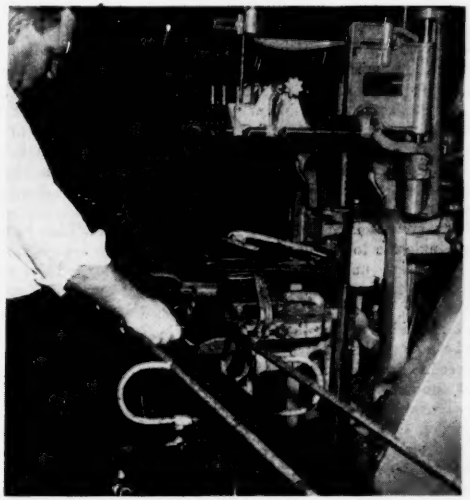
5 **STRAIGHTLINE UNSCRAMBLER.** Empties, unloaded from cartons, are discharged to automatic filler.



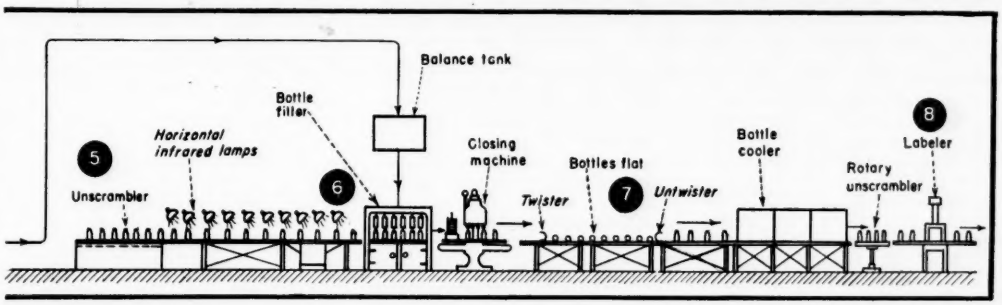
6 **INFRARED LAMPS** preheat cold, empty bottles as they travel to vacuum filler, thus reducing breakage.



7 **CONVEYOR** carries filled bottles on their sides. Twister then uprights them before they go to cooler (right).



8 **LABELING** bottles of apple juice, two at a time. Bottles are then cased at the pack-off station.



ent four jobs are: (1) Unloading empty bottles from cartons onto the unscrambling table, (2) operating the filling machine, (3) working the labeler, and (4) packing bottles into shipping cases.

The additional five workers formerly needed performed these operations: Feeding bottles to the filler (two), hand-capping the bottles (one), feeding bottles into the cooler (one), and taking them out (one).

Bottle Breakage Minimized

As indicated, a prime aim in designing the new line was reduction of bottle breakage. Installation engineers almost completely did away with breakage by equipping the plant with a straightline unscrambling table, a battery of infrared lamps for preheating bottles, and a three-stage bottle-cooling system. The role of each in minimizing breakage will be described:

The unscrambler cuts down on breakage that formerly occurred when bottles were taken out of the cartons by hand and transferred to the bottle conveyor. It also reduces to a minimum the number of bottles that fall—a cause of breakage on the former rotary unscrambling table, where there was high peripheral speed and bottle crowding.

Depending upon bottle size, one operator can unload 60 to 240 bottles a minute from cartons onto conveyor. They are discharged by the conveyor in single file to the filler.

The high unloading capacities are credited to the different speeds of the conveyor belts. The belt on the discharge side runs at the fastest speed. The center belt travels at one-half speed. And the offside belt operates at one-quarter speed.

Traveling forward on these belts, bottles contact the discharge V-belt, which moves them toward the discharge point. This belt functions to prevent bottle jams.

Breakage at the filling machine has been greatly reduced by preheating the cold bottles with a battery of 375w. infrared lamps. There are 20 lamps—10 set above each side of the conveyor that feeds bottles from unscrambler to filler. The lamps are adjustable for a wide range of different size bottles. Heat is directed from these lamps on the shoulders and bottom rims of the bottles—areas vulnerable to breakage.

Before infrared lamps were installed, bottles entered the filler cold. Hence, some of them broke while they were being filled with hot apple juice.

The three-stage feature of the continuous cooler also minimizes breakage and cuts down on the amount of water required to cool the bottles. This cooler is 36 ft. long and 4 ft. wide. It is equipped with an open-mesh, flexible-metal belt run by a variable-speed drive to match the speeds of the filler and capper. Rate of bottle-travel can be varied between 6 in. per min. and 1½ ft. per min.

Bottles are cooled in the three-section unit by water flowing counter to the direction of the bottles. The first 12-ft. section of the feed end uses the warmest water (120 to 130 deg. F.), which has progressively traveled from second and third sections. The second section has water of a lower temperature (90 to 100 deg. F.), this water being pumped from the third section. In the third section, the feed water (at 50 to 60 deg. F.) is piped directly from well or city supply to the spray headers.

Here in the third section, the temperature of the bottles is further reduced to about 100 deg. F.—enough to permit labeling and packing when they leave the cooler and come off the rotary unscrambler next in line.

Thus the bottles are cooled progressively by gradations in the temperature of the water. Only once is the water heated—to warm the first load of bottles that travels through the cooler. From then on, heat from the bottles of hot apple juice warms the water.

In addition to saving steam, this regenerative system which cools the hot, pasteurized juice also cuts down on the amount of water needed. It now takes only 15 gal. of water to cool 20 gal. of apple juice. Formerly, 45 gal. of water were required.

On leaving the cooler, the bottles of apple juice discharge onto a rotary unscrambler, which is used to feed bottles in a short single line to the labeler, without jamming. Finally, the labeled bottles are packed into cases at the rotary pack-off station.

Making the Apple Juice

Apples are delivered to the plant by trucks, principally from nearby farms. On arrival, the apples are first inspected and unloaded into troughs. Here, lead and arsenic spray residues are removed by washing the apples in a 1½ percent solution of hydrochloric acid, made by mixing 4½ gal. of concentrated hydrochloric (muriatic) acid solution to 100 gal. of water.

As the apples are elevated to a second hopper by a conveyor, they are further washed with sprays of cold water. The apples are then fed to a grater, which has a series of rotating knives that are spaced about 1/32 in. apart. The grater is placed so that crushed fruit (pomace) falls on an open press cloth which is fitted on a rectangular wooden form.

The next step is forming the "cheeses". This involves setting a wooden form over a rack, placing a press cloth over both so that the margins of the cloth are equal on all sides, and adding pomace from the grater until the form is filled. Next, the pomace is leveled, the margins of the cloth are folded, and the form is removed. Then a wooden rack is placed on top of the cloth containing the crushed fruit. This is followed by the form and another press cloth, which is then filled with more apple pomace. This procedure is then repeated until the capacity of the hydraulic press is reached, or until 17 of the cheeses are formed.

The cheeses holding 1½ tons of pomace are run under a hydraulic press where pressure of 3,000 psi. is applied, thus forcing the juice out of the apple pomace. Each pressing yields about 250 gal. of juice.

The juice is pumped into 15,000-gal. wooden tanks, located in a cold storage room where the temperature is kept at 36-40 deg. F. Total capacity of the cold storage room is about 60,000 gal. of juice.

Clarifying the Juice

First step in clarifying the juice is to add 20 oz. of the pectin-splitting enzyme preparation, Pectinol, to 100 gal. of the juice. The enzymes immediately act upon the pectin, converting it into insoluble pectic acid which, on precipitation, carries down other suspended matter that causes cloudiness in the juice.

Removal of these insoluble substances, particularly the gummy matter, increases the efficiency of the filtering operation. Several days later, when sedimentation has become complete, the juice is racked and pumped into a mixing tank.

At this point, the juice is again clarified. About 5 lb. of diatomaceous earth is mixed with 750 gal. of juice. The juice then goes through a plate-and-frame filter equipped with asbestos filter pads.

Final step in preparing the juice for bottling is pasteurizing to 180 deg. F. in a plate-type heat exchanger having a temperature control unit. Pasteurized juice is then delivered to a balance tank, which is equipped with an automatic float that regulates the flow of juice to the automatic vacuum filling machine.

TECHNICS USED: Sample of egg is weighed on tortion balance (left), then the fatty material containing yolk pigment is dissolved in acetone, and color reading is made on photelometer (right).

Now—A Quick, Reliable Gage of Yolk Color

Intended to set standards, method designates values by numbers, insuring uniformity. Inexpensive instrument can be operated by plant worker

O. J. KAHLENBERG

Director of Research,
National Eggs Products Assn., Chicago, Ill.

To meet the high demand for commercially packed egg yolk of a definite color, the National Egg Products Assn. has developed a rapid, reliable method of measuring yolk color quantitatively.

Its first object is to provide bakers, makers of macaroni products, and other food processors with a procedure for determining these color values in terms of pigment in egg yolk. Aim also is to dispel the considerable confusion that exists by setting up a color-determination procedure that will give uniform, reproducible results and be accepted nationally.

Both egg packers and users have been dissatisfied with the usual visual determinations—especially when color paddles, color mixtures, and extracted yolk samples are measured by color comparators, Nessler tubes, and visual colorimeters. Published results reveal the limitations of paint pigments[1] and Lovibond filters[2] as standards in evaluating egg-yolk color.

The purpose of this article is to present a simple and practical procedure with an inexpensive instrument based on scientific standards that even a plant man can operate. To that end, a comparison of color results with the recommended inexpensive photelometer and various spectro-photelometers, show good agreement for all practical purposes.

This method is a modification of a visual Nessler tube procedure for determining yolk color, outlined by Turner and Conquest[1], adapted to a photelometer. It makes use of this photo-electric filter photelometer to evaluate acetone-extracted pigments by comparison with various aqueous potassium dichromate standards.

The method is rapid, reliable and practical to the extent that, when once the calibration curve is made, it is satisfactory for plant adaptation. By applying the photelometer to a well-known visual Nessler tube procedure, the guesswork in color determination due to the human element is eliminated.

ESSENTIAL PARTS of photelometer: (T) Constant wattage transformer; (S) light source; (I) iris diaphragm; (L) lens; (A) absorption cell, (F) light filter; (P) photoelectric cell and (M) microammeter.

These measurements of yolk color have the virtue that, when desired, colors can readily be expressed in less than whole number units.

These numbers are in terms of the aqueous potassium dichromate standard, which is equivalent to the color extracted from a definite quantity of egg by acetone.

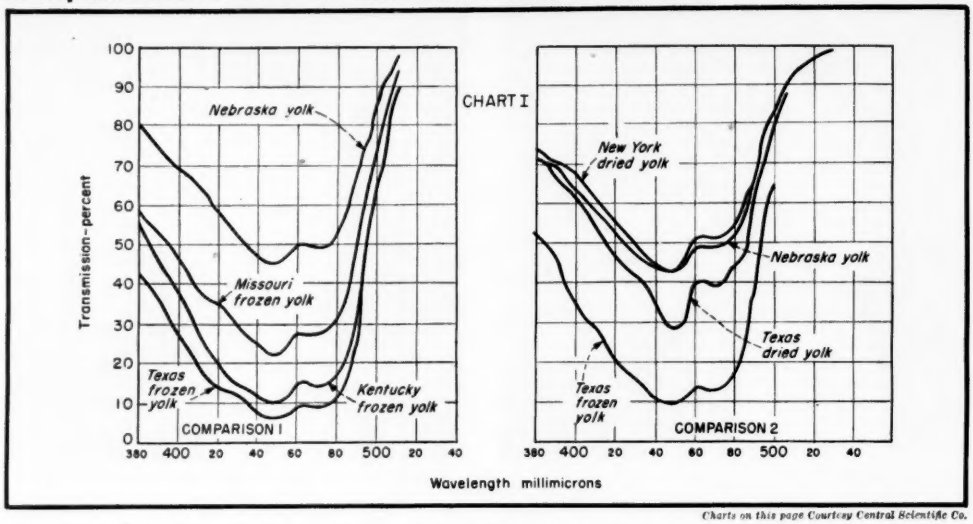
With refinements in technics and with new developments in the instruments, changes in the procedure and method of reporting can always be made before a detailed, permanent method is finally adopted. Although the method is tentative, it provides a working start that gives improved performance over methods now in use.*

Industry-wide acceptance of a test of this kind necessitated a study of transmission curves with reference to the position and intensity of the absorption bands of acetone-extracted yolk pigment from various sections of the country.

Liquid, frozen and dried yolks from New York, Nebraska, Kentucky, Missouri and Texas were examined for this study by means of a Ceneo-Sheard spectrophotelometer. The position of the various absorption bands for the

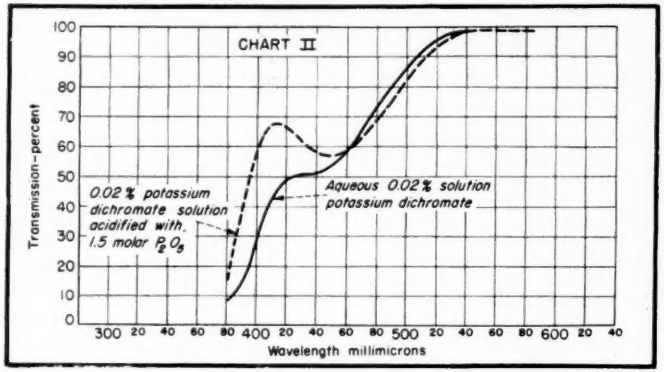
* A similar attempt has been made by the American Assn. of Cereal Chemists Committee on Methods for the Determination and Definition of Color in Eggs and was reported in an article by Dalby[3].

Absorption Bands of Different Yolks and Dichromate Solutions



Charts on this page Courtesy Central Scientific Co.

LIGHT transmission curves for solutions of egg yolk from different parts of the country show similarities in the position of their absorption bands, but variations in their intensities. Yolk pigments were extracted with acetone.



THE light transmission curve of a 0.02 percent aqueous potassium dichromate solution is modified by acidifying with phosphoric acid.

different samples was approximately the same, but the intensity varied, (see Chart I). Chart II shows the position of the various absorption bands for 0.02 percent C.P. potassium dichromate in equeous solution as compared with the same concentration of dichromate in 1.5 molar phosphoric acid.

Outline of Proposed Method

The method consists essentially of extracting egg yolk with acetone to precipitate the protein and to dissolve out the fatty materials which contain the yolk pigment. A portion of the clear filtrate is transferred to an absorption cell of a photelometer with the proper filter, and then a transmittancy reading is made. The number color of the yolk is obtained directly from a calibration curve.

Transmittancy readings can be made with a Cenco-Sheard-Sanford photelometer (industrial type B-2 instrument) or its equivalent. The blue filter (approximate maximum transmission of 410) supplied with the Cenco photelometer was used in our tests.

The instrument is standardized by reading the transmittancies of a number of standard aqueous solutions of Baker's C.P. potassium dichromate of the following percentage concentrations: 0.005, 0.010, 0.015, 0.020, 0.025, 0.030, 0.035, 0.040, 0.045, and 0.050. These dichromate solutions represent yolk colors Nos. 1 to 10, respectively, when 5g. of whole egg or 2.5g. of yolk are used and correspond to mg. of dichromate equivalent to the extracted color of 1g. of whole egg. The dichromate concentrations are conveniently prepared by proper dilutions of a stock solution consisting of 1g. of dichromate made up to 1 liter.

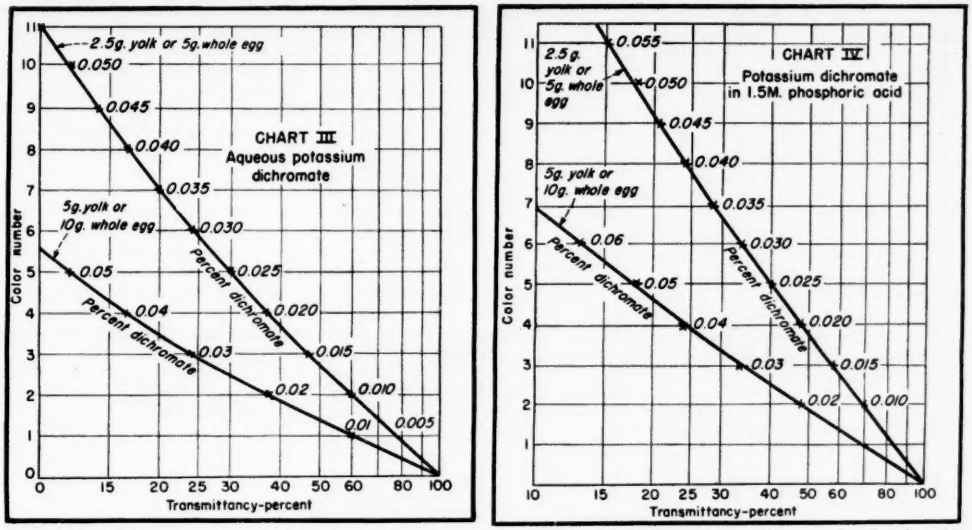
All glassware used in the standardization must be clean, rinsed with distilled water, and dried. A few drops of either alkali or acid will affect the standard dichromate color. The photelometer readings, when plotted on a semi-logarithmic scale against the known concentrations of dichromate on a linear scale, give an analytical or calibration curve (Chart III), against which the filtrate may be compared.

By means of this calibration curve, one can obtain the color of the yolk-acetone filtrate directly. For example, if the instrument reads 30 for the yolk-acetone filtrate, this number on the abscissa axis compares with the standard dichromate solution of 0.025 percent on the curve and therefore indicates yolk color of No. 5 on the ordinates axis. If the yolk-acetone filtrate shows a reading of 46, the yolk color of the sample is No. 3.

Method of Determining Color

The procedure is as follows: First weigh 2.5g. of well mixed frozen liquid yolk into a clean, tared 150 ml. beaker, using a torsion-balance (5g. liquid whole egg, 2.75g. 10 percent salted or 10 percent sugared yolk, 1.35g. dried whole egg or 1.15g. dried yolk may also be used). Next, add 2. 5 ml. C.P. acetone and then gently break up the

Calibration Curves Convert Photelometer Readings into Color Numbers



WHEN plotted on a semi-logarithmic scale against a known concentration of dichromate on a linear scale, photelometer readings give calibration curves against which yolk-acetone filtrates may be compared.

lumps of yolk with a glass rod and stir until smooth. Large quantities of acetone will, at this stage, cause hard lumps to form and make pigment extraction difficult. Now add 95 ml. C.P. acetone and continue stirring until the pigment of the yolk has been entirely extracted. Finally, filter the yolk-acetone mixture through a Whatman No. 4 filter paper into a clean glass bottle. And stopper the bottle so that the acetone will not evaporate.

Modification In Procedure

When 5g. of liquid whole eggs are to be checked for color, follow the same procedure as outlined, but use a total of 95ml. acetone. With the 10 percent salted yolk, first add about 2.25ml. distilled water and then extract with small portions of C.P. acetone, as previously described, until a total of 95ml. acetone is used. Difficulties were encountered in extracting the pigment of the salted yolk when the water was omitted.

The 10 percent sugared yolk sample is extracted with small portions of C.P. acetone, as outlined, until a total of 97ml. acetone is used. Since turbidity of the filtrate occurs in sugar-yolk mixtures, it has been found advisable to use a Whatman No. 12 filter paper.

In determining the color of dried whole egg or yolk, follow the procedure as outlined for frozen or liquid yolk. A total of 99ml. of C.P. acetone is used to extract the pigment.

The addition of sugar or salt to egg yolk does not materially affect yolk color results, provided one takes into consideration the amount of these additive substances when weighing out the original sample. The following results were obtained by adding 10 percent salt and 10 percent sugar to the same plain yolk sample:

	Amount Weighed, g	Transmittancy Reading, %	Color No.
Plain yolk	2.50	59	2.1
Plain yolk + 10% salt	2.75	56	2.3
Plain yolk + 10% sugar	2.75	58	2.1

To compare the results of the photelometer with the known visual Nessler tube system, 10g. of whole egg and 5g. of yolk were extracted with 90 and 95ml. acetone, respectively. These larger samples were necessary for the visual comparisons.

Results indicate that the photelometer method of determining color is much more accurate than the present system of visual comparisons with Nessler tubes, (see Table I). In the measurement of yolk color by means of acidified potassium dichromate (1.5 molar phosphoric acid) as advocated by Dalby[2], it has been our experience that the color of aqueous or unacidified dichromate solutions of the proper purity matches more closely that of the extracted pigments of eggs.

To study this phase, 5g. of fresh yolk was extracted with 95ml. acetone. Color of the yolk pigment was measured by the two dichromate standards, and the photelometer results compared with the visual Nessler tube system. It was necessary to prepare a calibration curve for the acidified dichromate standard (see Chart IV).

It is observed in Table II that the visual and photelometer results compare favorably when aqueous dichromate standards were used. There were, however, variations of as much as three whole color numbers between the visual and photelometer color results when acidified dichromate solutions were employed as standards.

This lack of correlation, when acidified dichromate solutions are used as standards, is apparent in the 14 collaborative results of egg-color determinations reported by Dalby[2]. Visual methods of comparison showed color results on Sample A to vary from 4.0 to 5.9 and for Sample B from 5.0 to 9.3. The numbers represent mg. dichromate equivalent per g. of egg. Only two out of the 14 collaborators used photoelectric instruments. Their results checked very well.

Acidification Causes Variations

In view of such wide variations in color numbers on the same samples, the reliability of the procedure must be questioned, especially when acidified dichromate is used.

In checking dried whole egg and yolk for color, some samples were placed in an oven at 100 deg. C. for varying periods of time. It was observed that with the passing of time the color was either bleached, combined or lost, (see Table III).

The practical application of this measurement is to advise dried egg and dried yolk manufacturers not to over-expose the yolk to high temperatures.

There is considerable confusion with

reference to standards of uniformly expressing yolk color among the producers and the users of eggs and egg products. It is our understanding that many in the bakery trade recognize a Nessler tube color corresponding to 0.020 percent dichromate when the same amount of sample is weighed as a No. 2 color. Many organizations do not use potassium dichromate as the standard but prefer carotene solutions. W. Loy, a member of the National Egg Products Assn. Technical Committee, and chief chemist of Wilson & Co., has shown the following approximate relationship between p.p.m. carotene and yolk color in terms of percent dichromate when 10g. whole egg or 5g. yolk are used (the standard consisted of 90 percent beta and 10 percent alpha carotene):

Dichromate Percent	Carotene P. P. M.	NEPA Yolk Color
0.01	15	1
0.02	40	2
0.03	70	3
0.04	90	4
0.05	120	5
0.06	150	6

Many technical people feel that the best and most convenient way to express color is in terms of the standard itself, such as mg. of dichromate equivalent to the color extracted from 1g. of whole egg. The cereal chemists[2] agree to this method of reporting color for scientific purposes but recommend a color index for commercial practice.

This index is obtained by using a factor of 25 as a multiple of the number of mg. potassium dichromate equivalent to the color extracted from 1g. of egg. The proposed NEPA method is in favor of assigning color numbers corresponding to the standards themselves, provided that the amount of sample is also given at the same time.

It will be observed in the NEPA method that the samples of liquid and dried yolk are not weighed in accordance with egg solids, but rather in quantities which have been in general use for bakery color specifications of eggs for some time. For example, the amount of liquid egg yolk weighed out (2.5g.) was arbitrarily set at one-half the amount weighed for whole egg. The cereal chemists[2] recommend similar quantities, such as 5g. mixed eggs and 2g. of yolk.

To clarify and justify the quantities of material finally adopted for the NEPA color method, an examination of the calibration curves of Chart III is necessary. The particular photelometer used did not give a complete range of No. 1 to No. 10 color when 10g. whole egg or 5g. of yolk sample was used. In fact, one could obtain only as high as a No. 5 color (0.05 percent dichromate). To get the complete range it was necesesary either to cut the sample to 5g. whole egg and at the same time halve the aqueous dichromate standards, or to extract the 10g. whole egg with 190ml. acetone.

Since the latter procedure required considerable amounts of C. P. acetone, the laboratory decided to use a 5g. sample for whole egg and a 2.5g. sample for yolk. Our experience has been that although one occasionally obtains colors above No. 5 from some sections, the majority of yolk colors with this method are below No. 5. It has also been observed that the pigment appears to be completely extracted from the egg when 5g. whole egg and 2.5g. yolk are extracted with 95 and 97.5ml. acetone, respectively.

It will be noted in Table IV that when the weight of the sample is doubled, the extracted pigment is evaluated with twice the concentration of aqueous dichromate, so that the color numbers remain the same. The transition, therefore, from the visual Nessler tube system to the more accurate photelometer procedure should be quite simple.

It is difficult to correlate the findings of Dalby[2] with those reported in this article, because results obtained by 12 out of the 14 collaborators varied widely when visual comparators were used with the acidified dichromate standard. Considerable differences in color had been noted between aqueous and acidified dichromate solutions using the visual Nessler tube system (Table II). A comparison of Charts III and IV, when the same photoelectric instrument was used, show higher color numbers for the acidified than for the aqueous dichromate.

Acknowledgments

The author wishes to thank M. M. Lally, chemist, National Egg Products Assn. Research Laboratory, for analytical data; M. Loy, Wilson & Co. for data correlating NEPA color numbers with carotene solution standards, and L. Mink, Swift & Co., for samples of yolk from various sections of the country.

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Color Numbers by Photelometer and Visual Nessler Tube Methods

TABLE I—COLOR NUMBERS Obtained With Photelometer are Extremely Accurate

Product	Sample No.	Color Number: NEPA Method	Color Number: Visual Nessler Tube Method
Whole eggs	1	1.3	2
	2	1.2	2
	3	1.4	2
	4	1.3	2
	5	1.7	2
	6	1.6	2
	7	1.7	2
	8	1.6	2
	9	1.4	2
	10	1.5	2
	11	2.3	3
	12	2.6	3
	13	2.3	3
	14	2.2	3
	15	2.0	2
Egg yolk	16	2.3	2
	17	2.3	2
	18	2.3	2
	19	2.2	2
	20	2.0	2
	21	2.2	2
	22	1.9	2
	23	1.4	2

TABLE II—COMPARATIVE Color Numbers Using Aqueous and Acidified Potassium Dichromate as Standards.

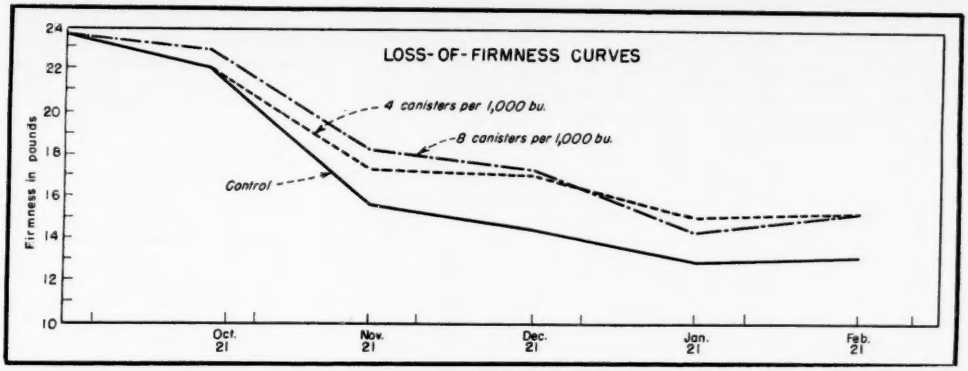
Product	Sample No.	Dichromate Standards: Using Photelometer, Aqueous Color No.	Dichromate Standards: Using Photelometer, Acidified Color No.	Dichromate Standards: Using Visual Nessler Tube, Aqueous Color No.	Dichromate Standards: Using Visual Nessler Tube, Acidified Color No.
Yolk	24	4.3	5.5	4.0	2.0
	25	2.3	3.2	2.0	1.0
	26	1.2	1.6	1.0	1.0
	27	3.0	4.0	3.0	1.0
	28	2.0	2.8	2.0	1.0

TABLE III—EXPOSURE TO HEAT Reduces Yolk Color (1.25g. sample used)

Product	Sample Number	Hours at 100 Deg. C.	NEPA Color No.
Dried whole egg	29 (control)	0	2.0
	30	1	1.7
	31	3	1.5
	32	5	1.4
	33	7	1.4
	34	16	1.2
	35	24	0.9
Dried yolk	36 (control)	0	2.2
	37	1	2.0
	38	3	1.9
	39	5	1.8
	40	7	1.7
	41	16	1.5

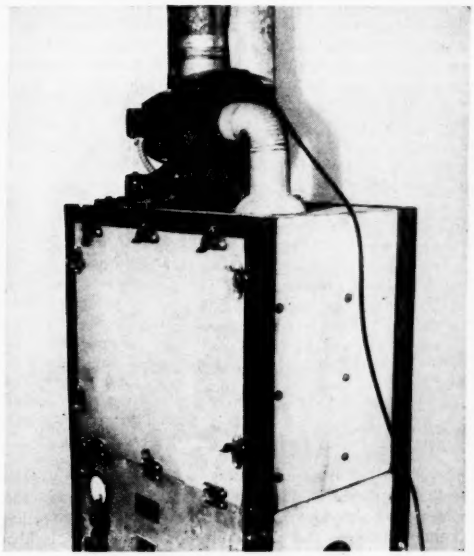
TABLE IV—WHEN STRENGTH of Chromate Solution is Increased Proportionally, Size of Egg Sample Does Not Affect Color Number

Percent Dichromate in Standard: 5g. sample	Percent Dichromate in Standard: 10g. sample	NEPA No.
0.005	0.01	1
0.010	0.02	2
0.015	0.03	3
0.020	0.04	4
0.025	0.05	5
0.030	0.06	6
0.035	0.07	7
0.040	0.08	8
0.045	0.09	9
0.050	0.10	10



WHY it pays to control amount of ethylene in air of apple storage rooms is shown by loss-of-firmness curves for Rhode Island Greenings at 36 deg. F. Air was purified with four and eight canisters of activated coconut shell carbon per 1,000 bu.

HOW ethylene and certain odors are removed from storage room air. Part of air drawn into cold diffuser is aspirated through carbon canisters (left).



CONTROL of surface molds, as well as some odors, is achieved by ozone generator. A blower distributes ozonized air throughout room.

Controlled Atmospheres Improve Refrigerated Storage

Removal of ethylene by activated carbon lengthens fruit storage life.

Carbon and ozone control certain odors. Other technics evaluated

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"Cold alone is not enough." That was the advertising slogan used by the ice industries before World War II. The particular factor they had in mind was water vapor present in the air. And there was a great deal more in their slogan than they seemed to realize.

Cold alone is not enough. The importance of refrigeration for foodstuffs cannot be over-emphasized, but there are many aspects of the atmosphere around the foods that are very important.

Carbon Dioxide Applications

There are at least two applications of the use of higher than normal amounts of carbon dioxide in the atmosphere around stored foods. The

first, known as "carbon dioxide treatment," involves the use of concentrations of 15 to 50 percent carbon dioxide around certain fruits for relatively short periods. This treatment has become almost a standard practice in the refrigerated transport of sweet cherries from the West Coast[1]. It has been used to double the storage life of fresh raspberries and strawberries. And the application of CO_2 (15 percent for 6 hr.) also has been employed to kill rodents in apple storage.

A second use of higher than normal amounts of carbon dioxide is in "controlled atmosphere storage" of apples and pears[2]. In this technic, 5 or 10 percent (depending upon the variety) of carbon dioxide is employed in conjunction with a low oxygen concentration in gastight refrigerated storage.

In England, this procedure is called "gas storage," and it has become a standard practice for many English varieties. In the United States, the practice has been limited to New York. Controlled-atmosphere storage will double the normal storage life of varieties of apples like McIntosh. In the spring of 1948, McIntosh apples out of controlled-atmosphere storage sold for $4 to $5 a bushel in New York City, while those from ordinary cold storage were worth only $0.75 to $2.

In controlled atmosphere storage, the fruit itself supplies the carbon dioxide through respiration. The oxygen is reduced through respiration also. There is a trend in New York and New England toward increased use of this procedure, and seven such storages have been built recently.

Low-Oxygen Atmosphere

The lower-than-normal oxygen atmospheres (2.5 percent) used in controlled atmosphere storage of apples and pears[3] also are produced by the fruits themselves through respiration. Fresh air is added to maintain the oxygen level at 2.5 percent.

Water Vapor Important

The importance of the proper water vapor content of the air around fresh foods in storage is commonly recognized. The proper relative humidity prevents weight loss and deterioration in appearance. The relative humidity requirement varies, of course, with different foods.

The water-vapor loss from a food product is determined not only by the relative humidity in the storage chamber but by vapor-pressure differences between the product and the storage atmosphere. A product like leaf lettuce with a field temperature of 80 deg. F. may shrivel when moved into a 32 deg. F. storage chamber, even though the storage relative humidity is 100 percent! This is because the vapor pressure of the product is so much higher than the vapor pressure of the storage air.

Ethylene Stimulates Ripening

It has been known for many years that immature bananas, oranges, apples, and pears had their ripening rate stimulated by the use of ethylene. In more recent years it has been found that: (1) These fruits evolve ethylene as they ripen, (2) a lot of ripe fruit (evolving ethylene) in storage might stimulate the ripening rate of less-ripe fruit in the same room, and (3) ripe fruit in a storage room might reduce the life of apples by as much as 25 percent.

Furthermore, it was discovered that if the atmosphere around unripe fruit was kept free from naturally evolved ethylene (even in the absence of any ripe fruit) the storage life could be lengthened.[3]

The undesirable effects of ethylene led to air purification with coconut-shell activated carbon to remove some of the ethylene from the storage space. This adds from four to six weeks to the storage life of apples. And recent studies at Oregon State College showed similar benefits with Anjou pears.

The activated coconut-shell carbon is commonly enclosed in canisters, and storage air is aspirated through the canisters. For apples, four such canisters per 1,000 bu. are recommended. The accompanying curves (preceding page) show the softening rate of Rhode Island Greening apples at 36 deg. F. with four and eight canisters per 1,000 bu. of fruit. There seemed to be no advantage of eight canisters over four.

A number of commercial installations of activated carbon have been made to lengthen the storage life of apples. A rather small commercial installation is illustrated on the preceding page. One-fourth of the air going into the cold diffuser is purified on each pass through.

After the activated carbon has been used for one season, it is sent back to the manufacturer for reactivation. This reactivation is achieved by heating the carbon to about 2,000 deg. F. with superheated steam.

In future experiments with activated carbon, attempts will be made at new designs of the equipment to contain the carbon. Experimental work is also under way with pears and some of the soft fruits, such as peaches.

Control of Apple Scald Gases

Apples, as they ripen in storage, give off certain gases (other than ethylene) which if allowed to accumulate around the fruit will cause the disease known as "scald." The skin is actually "burned" by these gases.

The standard method of control of this troublesome disease in the past was the use of shredded oiled paper or oiled paper wraps. A new method of control which is cheaper than the use of shredded oiled paper is air purification with activated coconut-shell carbon. The technic is the same as for ethylene removal.

Twenty-two commercial scale tests with this procedure have shown that when the scald-susceptible variety is stored alone in a room, air purification always does an excellent job of scald control. In mixed variety storage, the results have ranged from excellent to poor. Some varieties, such as McIntosh and Northern Spy, seem to evolve more of the scald gases than others.

Workers at Rhode Island State College propose a carbon dioxide treatment of 50 percent concentration for five days at the beginning of the storage season to control scald[4]. This procedure is safe with some varieties but injures some others. Workers in the U. S. Dept. of Agriculture propose a dipping treatment of alpha napthalene acetic acid in a lanolin emulsion to reduce scald[5]. Definite recommendations are not yet being made for commercial trials.

Avoiding and Removing Odors

Many foods can absorb objectionable odors in storage, and hence have their salability reduced. For example, apples can absorb the vapors of potatoes. Not only are other foods the source of cross-transfer of odors, but there are additional possibilities. Some building materials evolve enough objectionable odor to contaminate certain foods. Some container materials may do the same thing. For example, some years ago flats and fillers used in egg cases were made of straw. The eggs absorbed a typical straw-like odor.

Poor sanitation in a storage room may be the cause of bad odors. In one storage visited by the author, the growth of surface molds and slime-producing bacteria was so profuse on the walls that the apples stored in the room had a typical chicken manure odor!

The most obvious procedure in the matter of odor transfer is one of prevention. Certain foods should not be stored together. Frequently they do not even have the same temperature or humidity requirements. For example, apples and potatoes have different temperature requirements. Apples and onions have different relative humidity requirements.

Certainly the matter of absorption by foods of the odors of molds and bacteria is one of prevention. This is purely a matter of plant sanitation!

The odors of containers and building materials should be avoided, not approached with a corrective measure. Nevertheless, odor problems are still encountered at times in actual storage practice, and the question arises as to what can be done.

Studies at Cornell sponsored by the Refrigeration Research Foundation concerned the matter of odor removal by various means. The findings[6, 7, 8] are summarized here:

Apple Storage—An actual commercial problem was presented in which the vapors of yellow pine in the building construction were affecting the eating quality of stored apples. Experimental study showed that air purification with coconut-shell carbon would remove these vapors satisfactorily. The use of ozone did not remove these odors; it merely masked them. Where very high humidities are necessary (as they are with certain varieties), it is possible to avoid surface molds, and hence moldy odors, by the use of ozone.

Onions—Vapors of onions in mixed-produce storage were removed with air purification with activated coconut-shell carbon. Ozone (up to 15 parts per million) did not remove these vapors.

Cabbage—Vapors of cabbage in mixed-produce storage were removed by means of air purification with activated coconut-shell carbon. Ozone was not tried.

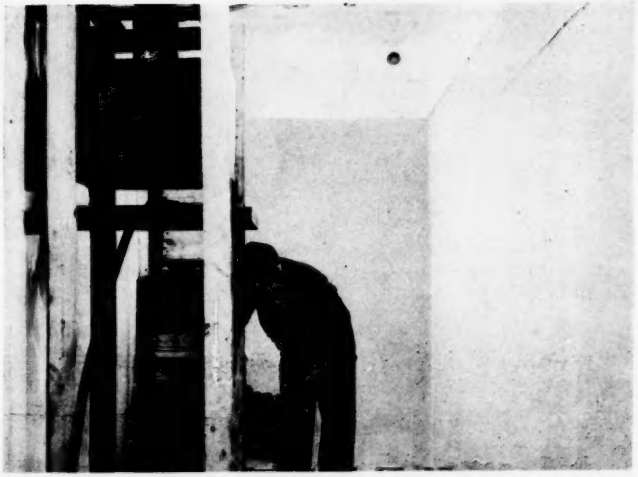
Potatoes—Vapors of potatoes were removed satisfactorily by means of air purification with activated coconut-shell carbon in both small-scale studies and in one commercial apple-potato combination in storage. Ozone was not tried.

Pears—Odorous constituents of pears were removed by air purification with activated coconut-shell carbon. The use of ozone reduced the odor level slightly. Apparently, this was due to the effect of the ozone on surface molds, not on the pears directly.

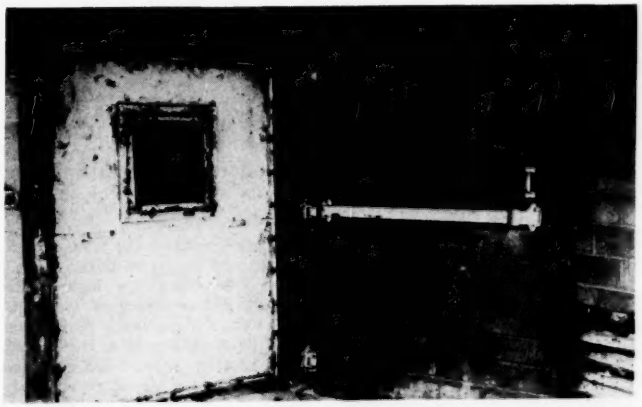
Oranges—Activated-carbon treatment removed orange vapors in a small scale study. Ozone did not remove these vapors.

Fish—Activated carbon treatment removed some, but not all, of the fish odors in one small-scale study. It is quite possible that not enough carbon was used. Ozone did not remove these fish vapors.

Egg Storage—Activated-carbon air-purification treatment removed the odor of used case materials and surface molds in egg storage. Obviously, it is important to avoid such molds in high-humidity egg storage. Ozone can be used to do this. Air purification with carbon tended to remove the typical "flat" or "storage" odor of stored eggs. This was true when new case, flat, and filler materials were employed.



NECESSARY for controlling atmospheres is gastight construction of walls, as illustrated by sheet-metal lining in this experimental controlled storage room.



GASTIGHT doors also are needed for storage rooms in which the atmosphere is to be controlled. Door with window seals entrance to storage room.

Odor-Removal Agents—It should be noted that the only commercial-scale study made in odor removal was in the apple-potato combination. The actual quantities of activated coconut-shell carbon needed for the foods studied remain to be determined for commercial practice. The studies have shown, however, that air purification with this material has considerable promise. Ozone was found to be a masking agent for the odors studied, but it actually may prevent certain odors (i.e., those due to surface molds).

Air purification to remove various food odors by means of silica gel and certain activated clays and bauxite was also studied. Such materials seemed to have a high initial rate of adsorption for some odors, but they desorbed or lost the odors to the atmosphere again.

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ON THESE aluminum carriers, two lower and one upper extrusion serve as body stiffeners as well as protective rails.

Aluminum Truck Bodies Adopted for Longer Life

Designed to carry meat products for Merkel, Inc., their corrosion resistance and lower repair bills more than offset higher initial cost

MADE entirely of aluminum and designed to provide a truck body of exceptionally long life by the elimination of corrosion, a new type body has been designed by the Grumman Aircraft Engineering Corp., Bethpage, Long Island, N. Y., for Merkel, Inc., processor of meat products in Jamaica, N. Y. The body consists of inner and outer skins made of relatively thick sheets of aluminum alloy.

Most steel truck bodies get their strength and rigidity from a steel floor, around the periphery of which are rigidly fixed a series of risers, or vertical steel posts, which carry the roof. Thin sheets of steel are fastened on the outside of these posts to close in the body and protect the load. Other sheets of even thinner steel or plywood are fastened on the inside to provide a smooth surface to facilitate stacking or piling the load.

But the Merkel-Grumman body gains its strength and rigidity from its inner and outer skins, placed 4 in. apart. The outside skins of all the bodies are made of $\frac{3}{8}$ in. aluminum alloy sheets.

Of the 41 new-type bodies thus far furnished to Merkel by Grumman, 29 were for retail route trucks and 12 for over-the-road transportation. The inside skins of the latter bodies are $\frac{3}{8}$ in. thick, the same as the outside skins. The inside skins of the smaller route truck bodies are $\frac{1}{8}$ in. thick.

In both cases, the high tensile strength and flexibility of the aluminum skins mounted on a $\frac{3}{8}$ in. aluminum floor, on top of a $1\frac{1}{8}$ in. oak floor, actually support the roof and load without the use of risers. Only two pieces of oak strips, except for wood spaces between the skins, are used to carry the refrigeration plates, which weigh 250 lb. each.

Two Lengths

The bodies are made in two sizes, one with an overall outside length of 12 ft., for the smaller route trucks, and the other with a 15 ft. outside length for the road transport trucks. The widths and heights of both bodies are the same.

The bodies themselves are mounted on aluminum cross sills, which in turn are placed on aluminum longitudinal sills fitting directly on top of the truck chassis frames. The weight of the smaller body is 2,700 lb., the larger, 3,200 lb., both without refrigerating plates. These weights are both approximately 200 lb. less than the weights of conventional steel bodies of the same dimensions.

The new aluminum bodies cost about 25 percent more than steel bodies of the same size. From the knowledge and experience gained through 18 months of hard service, however, the company is satisfied that the cost will be more than compensated for in longer life of the aluminum body due to less corrosion and to a lower cost of body repairs.

In tests conducted by Merkel, it was found that moisture was ever present in its bodies. The prime factors in the body design, therefore, were prevention of corrosion and resistance to the fatty acids and salt brine solutions. It was further found that aluminum-base alloys were highly resistant to atmospheric exposure.

The company also discovered that there was definite galvanic action caused by joining dissimilar metals without proper protection and that there was an oxygen screening caused by contact of the metal surfaces with wet solids. Proper painting and sealing precautions were taken in joining dissimilar metals, and mastic was applied to all areas between the inner and outer skins and underneath the body.

It was learned that paint adhesion was improved by sand blasting and the use of a zinc chromate primer. To prevent corrosion on the unpainted interior, the skin and other fittings were

anodized. These measures solved all of the body problems to Merkel's satisfaction.

As to a lower cost of body repairs as compared with steel, Merkel believes that the one upper and two lower extrusions, or so-called moldings on the body sides and front, not only enhance the appearance but also serve as rub-rails to protect the panels and lettering and make it very easy to mask and touch up.

Body Construction

The bodies are standard Grumman bodies modified to Merkel specifications. They are both insulated and refrigerated to maintain a minimum low temperature of 35 deg. F.

Fiberglas is the insulating material employed. The space between the inner and outer skins is completely filled with the Fiberglas itself, contained between two layers of silver-backed vaporproof paper. The insulation is 3 in. thick on the sides and ends, and 4 in. thick in the roof.

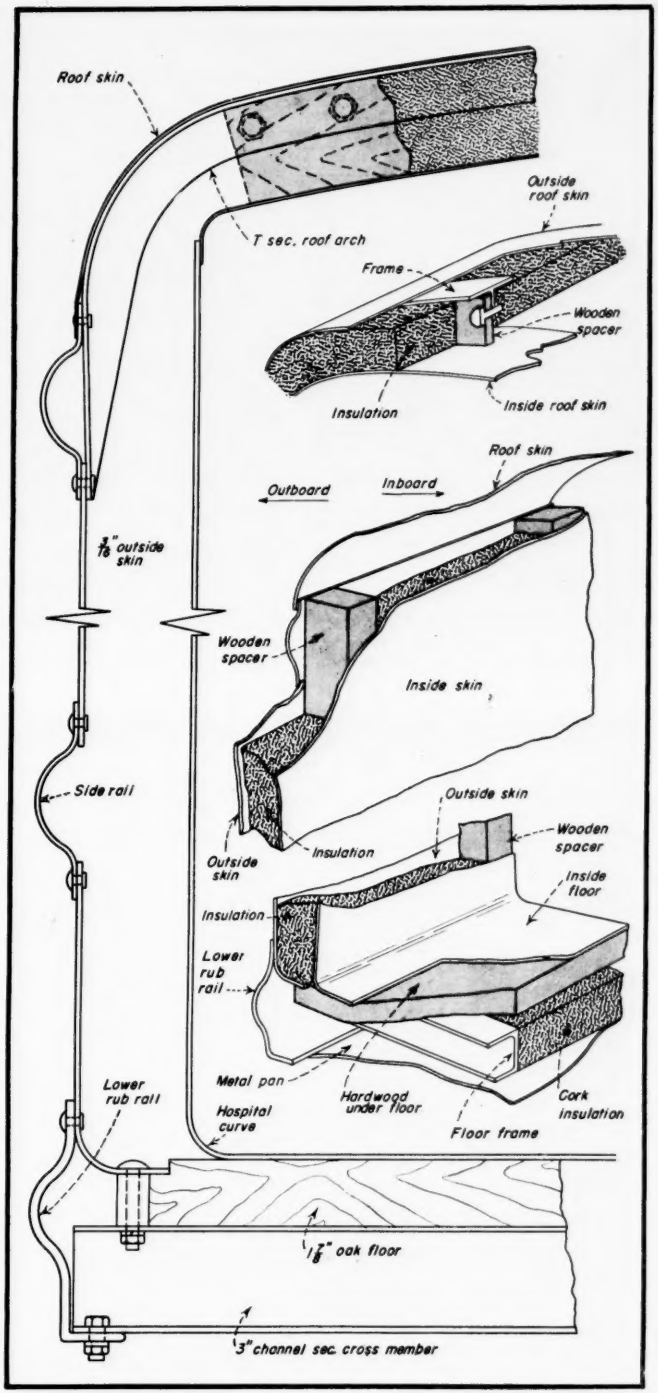
The body floor is unusual in construction, consisting of four layers. On the bottom there is a metal pan on top of which is placed 4 in. of cork. On top of the cork is an oak floor $1\frac{1}{8}$ in. thick and on top of that —to form the inside floor surface of the body—a $\frac{3}{16}$ in., 24ST aluminum sheet. The cork is sealed tight in tar.

The aluminum floor sheet is stretched across the body in one piece, with large radius curved hospital corners on either side, with the top edges of the sheet carried 18 in. above the floor level. Similarly, all interior and exterior corners and edges are curved throughout the entire body design. All seams and joints are batted, lapped and sealed with mastic compound and then riveted. Shelves and racks used in the bodies are also aluminum.

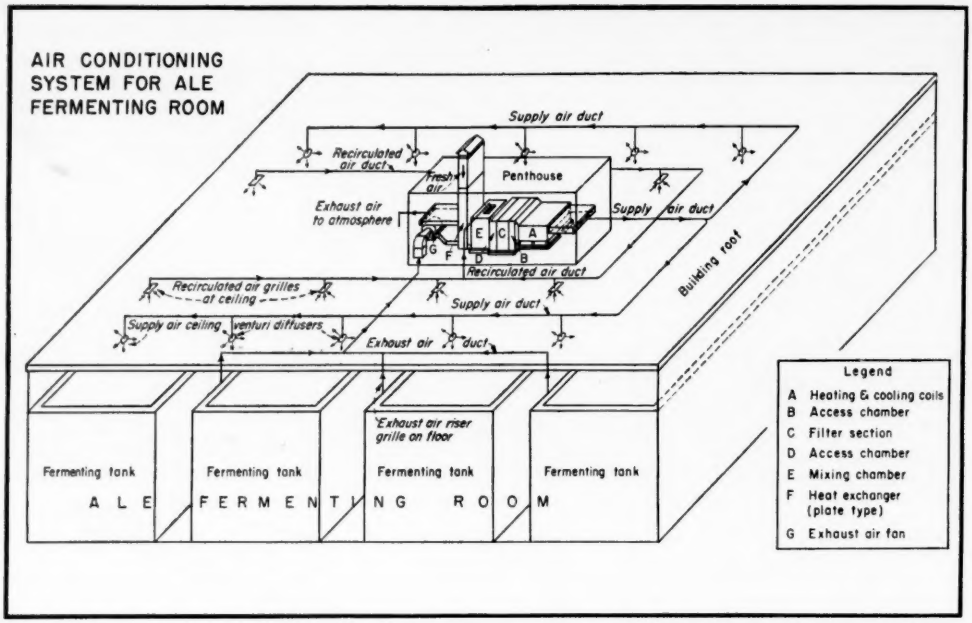
Efficient Refrigeration

Two types of refrigeration are used in connection with Koldhold plates in all of the bodies. On the retail delivery trucks covering the routes within one day, the Koldhold plates are refrigerated or recharged at night, in the company's garage, by hooking up to the plant's central ammonia system. This has proved very efficient. On the two-day truck runs, a Freon system, with a Servel compressor mounted on the truck, is employed. This equipment is provided with a 110-220v. electric plug-in motor to boost the charges in the plates when the trucks are stored overnight in outside garages at the outer ends of the routes.

The new 12 ft. aluminum bodies are mounted on International Model KB-5 chasses and the 15 ft. bodies on heavier, Model KB-8 Internationals.



CONSTRUCTION DETAILS of this new aluminum body are graphically illustrated in these drawings of floor, sidewall and roof.



HOW AIR is completely conditioned in O'Keefe's ale fermenting room is revealed in schematic drawing. Equipment installed in penthouse (see legend) services fermenting room via ducts carrying conditioned and recirculated air.

Engineered Air Conditioning Produces Triple Benefit

Canadian brewery has dust- and bacteria-free air, and uniform temperature in ale fermenting room. System removes CO_2 produced during fermentation

JAMES MONTAGNES
Toronto, Canada

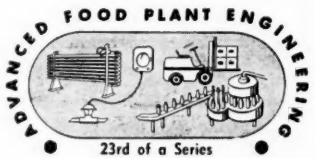
Better ale, better sanitation, and better working conditions have been the notable results attained at O'Keefe's Brewery, Toronto, with installation of a new air conditioning system for its ale fermenting room. In fact, this system has proved so successful that a similar facility is now being constructed for the company's lager fermenting room.

Characteristics of the system are bacteriological filtration, and uniform, low-velocity air distribution to all parts of the room. In addition, there is provided control of humidity and temperature, and also removal of the CO_2 evolved in the fermentation process.

The equipment to do this job comprises one of the most complete installations of its kind. Particularly kept in mind in its design was Toronto's varying temperatures — from 90 deg. F. in summer to —10 deg. F. in winter.

Components consist of a rough-air filter, a double bank of steel-wool filters, a unit of aluminum-fin cooling coils arranged for full flooded ammonia refrigerant, copper-fin steam heating coils, face and by-pass dampers, supply fan, exhaust fan, and heat exchanger. All of these units, and the required automatic controls, are housed in a separate, insulated penthouse located on the roof of the fermenting room. The ducts for conditioned air, recirculated air, and exhaust air are also on this roof.

Only the air supply outlets, and return and exhaust air grilles are exposed in the fermenting room. These are made of stainless steel to match the other trimmings in the room.

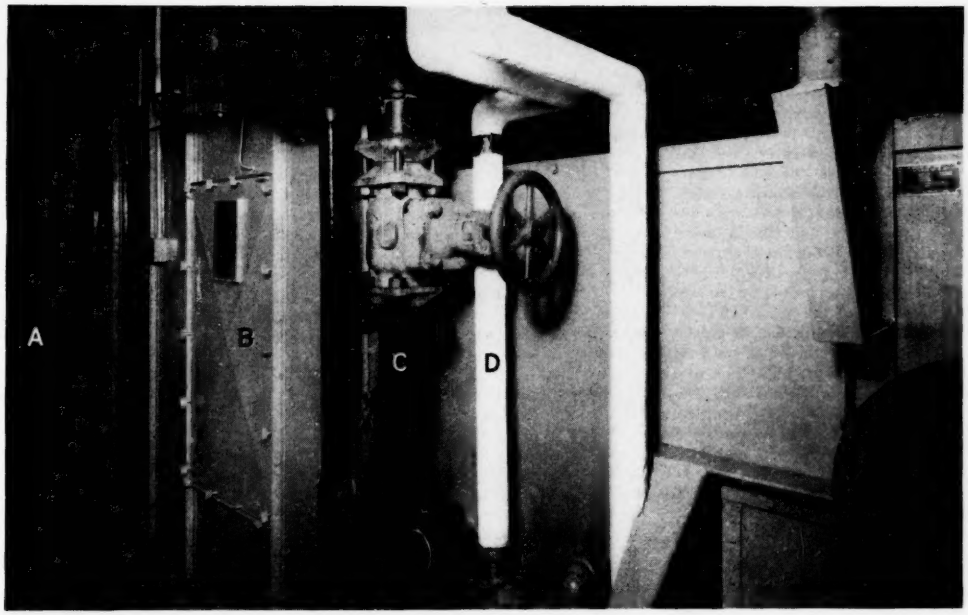


Capacity of the cooling coils, when supplied with 30 deg. F. refrigerant, is 26 tons of refrigeration. The heating coils have a capacity of 600,000 B.t.u.'s at 5 lb. steam pressure.

Bacteriological Filters Used

To keep the bacteria count to a minimum, all fresh and recirculated air is first passed through a rough air filter, then through a double bank of steel-wool filters. The latter contain twice the usual amount of filtering surface, and check tests have shown that they do a remarkable job in air purification.

Air is circulated through special surface-type outlets in the ceiling of the fermenting room. Each of these outlets is designed to distribute 1,500 cu. ft. of air per min. A splitter damper, installed in each branch duct, is locked in position after being set to deliver the correct amount of air. There is no perceptible draft, even at a point three feet from the outlet and directly in the air stream. This adds



COMPONENTS of conditioning system: (A) Mixing chamber for fresh and recirculated air, (B) filter section containing double bank of filters, (C) ammonia supply from accumulator (top) to cooling coils, (D) steam lines to heating coils.

to the comfort of workmen in the fermenting room.

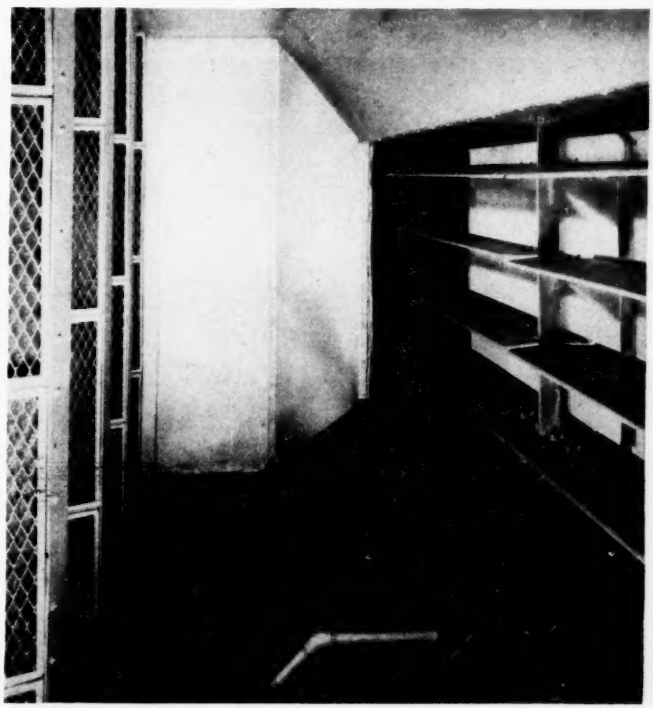
Air to be recirculated is taken out through grilles in the ceiling. The arrangement of these grilles, and the design of the supply outlets, is such that no short-circuiting of air can result. Carbon dioxide is taken out of the room through exhaust grilles located at floor level. This CO_2 is exhausted by means of a fan in the penthouse.

Motor Operated Dampers

Recirculated air is mixed with fresh outside air in a chamber located just ahead of the filters and air conditioner. The quantities of recirculated and fresh air, as well as exhaust air, are controlled by separate dampers, all operated by carefully synchronized electric motors.

The quantity of fresh air introduced into the fermenting room is governed by the amount of CO_2 given off from fermentation. Fresh air is proportioned so that a positive pressure is maintained in the room at all times. The exhaust fan is controlled so that it cannot start unless the supply fan is operating, thus eliminating the possibility of a vacuum being created within the room, which might cause entrance of unfiltered bacteria and dust laden air.

A unique heat exchanger was devel-



FILTERING chamber. Rough filters, for fresh and recirculated air, are on right. Air passes through steel-wool filters (left) on way to heating or cooling coils.

oped for the purpose of cooling, or heating, the incoming fresh air by means of the exhaust air passing out of the fermenting room. This exchanger consists of a series of copper plates separated by thin strips of plastic, all bolted together in a rigid frame. The air, which is removed from the fermenting room at 50 deg. F., passes upward through each alternate space. Here it comes into contact with the cool copper plates, and thus is cooled before entering the mixing chamber. The reverse takes place in winter, the fresh air then being heated by the outgoing air.

Capacity of the exchanger varies with the volume of incoming fresh air and outgoing exhaust air. It is also influenced by the difference in temperature between the two. With a temperature difference of 35 deg. F. in summer, the drop through the exchanger is 15 deg. Similarly in winter, with fresh air entering at 15 deg. and exhaust air at 50 deg., the fresh air is heated 15 deg., representing a considerable saving in steam. In summer, a similar saving is made in refrigeration.

Improved Storage Room

At the time the air conditioning system was put into operation, another test installation was made—in the storage tank rooms. Formerly, these rooms were entirely open and had to be hosed down and cleaned daily, and frequently painted. The rooms have now been sealed off and a glazed tiled corridor built between the rows of tanks in each room.

Painting Cost Reduced

Small doors at the end of the corridors allow easy access to the rear of tanks for frequent inspections. It is now only necessary to paint the corridor ceilings once every year, at a cost of approximately $40, where formerly the cost of painting the tank rooms and the tanks was $1,200 annually.

In addition to this, there is a saving in cleaning cost, since only the tiled corridors, with tiled floors, are hosed down daily. The tanks have not been painted since they were installed, in the early part of the war.

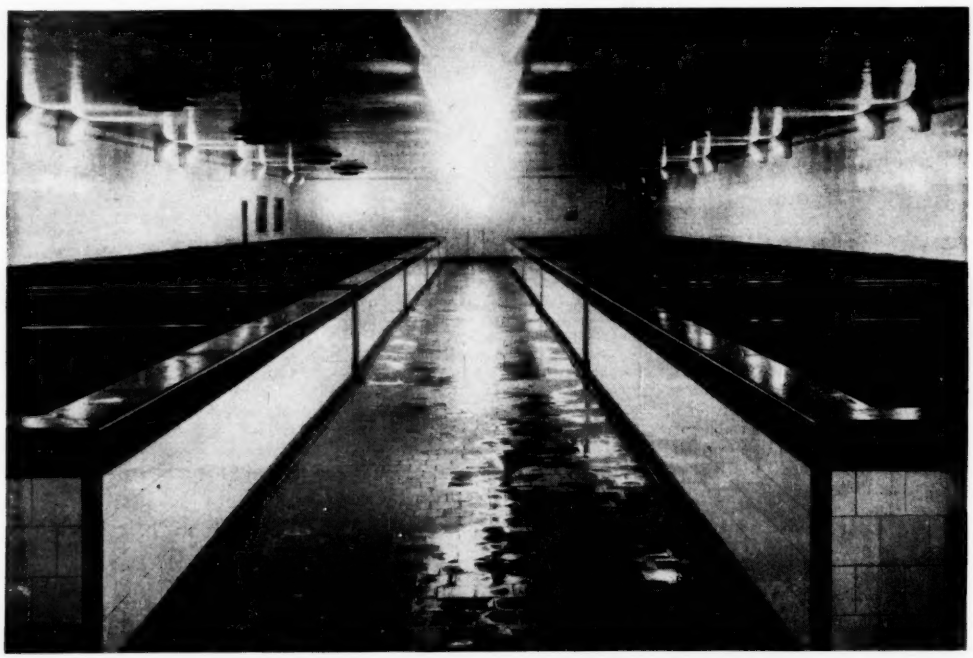
The corridors, in which only the heads of the tanks are visible, are well lighted for inspection by the public at all times. The gleaming white-glazed tiled walls, the tanks with white painted heads and polished copper controls, and the dark colored terrazzo masking rings around the heads of the tanks, give a look of spotless cleanliness to the brewery. The masking rings are cast in four sections. They are used in preference to metal decorative rings to prevent any possible corrosion.

As a further increase in efficiency and to conserve space in the brewery, the wooden fermenting tanks were replaced with rectangular, Plasti-glass lined steel tanks. The temperature in the room, at the mezzanine floor level where the tanks are open, is kept constant by the air conditioning system described above. The room is well lighted. It has tile walls and floors and a brilliant white painted ceiling. Upper parts of the tanks are also tiled and trimmed for sanitation and appearance.

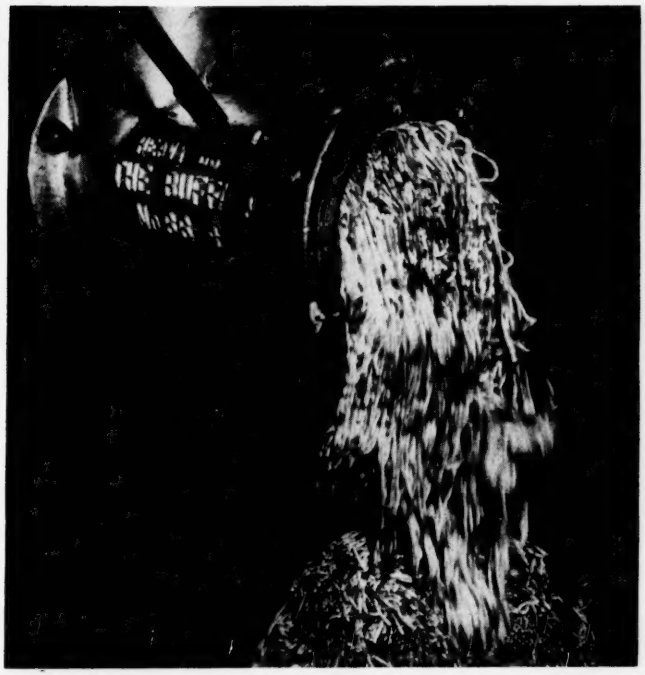
Yeast Discharged Near Top

Outlets for the discharge of yeast as it builds up in the tank, are slides which spill the yeast over into a tiled corridor below the mezzanine floor. Here, it is collected in stainless steel buggies for further use by the company—as a by-product or for re-use in brewing. Beer is drained off through outlets at the bottom of the fermentation tanks, and it is then transferred to storage tank rooms for further processing before it is ready to be bottled.

These tank installations have since been built into new plants of O'Keefe's in other parts of Ontario.



GRILLES and surface-type outlets, in ceiling of ale fermenting room, permit continual changes of air without perceptible draft. Seen here are Plasti-glass lined steel fermentation tanks which replaced wooden tanks.



MEAT is ground faster and mashing of it reduced by use in this grinder of improved knives with special-alloy cutting edges. Note uniformity of product.

Grinding Improved by New Knives

Cutters used in Newark plant last much longer, and they turn out better products. Maintenance is simpler, too

J. J. FINNERTY

Plant Manager, Hygrade Food Products Corp., Newark, N. J.

Output has been stepped up, yield from raw material increased, maintenance reduced, and quality of sausage-meat products improved by the use of new meat grinding knives at the Hygrade Food Products Corp. plant in Newark, N. J. The knives are of stainless steel with cutting edges of cemented carbide, the same alloy which has almost revolutionized metal-cutting practices.

To date, our company has cut several million pounds of meat with the new knives. We have found that they grind all types of meat faster, keep the meats cooler, and prevent them from becoming mashed during grinding. As for the knives themselves, they last longer and save wear and tear on the grinding machine. Not only that, the razor-keen edges cut the meats so finely that grinder clogging is reduced. Because of this, the grinders are more sanitary and require less cleaning. The knives do not rust or corrode.

Because of the sharpness, the life of these knives ranges from several months to more than a year, depending upon the type of operation and the care they receive. Life of knives made from ordinary cast steel, on the other hand, is generally gaged in weeks —sometimes days.

We know of one packer who has used these knives for 18 months on a lard hasher without replacement. This packer previously used two sets of knives and grinding plates a week.

Mashing Minimized

Sharpness of the new cutting edges has, we find, avoided mashed meats—improperly ground meats that are forced through the grinder plates.

When meats are mashed, they lose their color and texture. With the meats properly ground, their consistency is more uniform. Also, maintenance time is saved because less sinews and gristle are collected in the grinder.

By using these knives, less power is required to operate the grinder and, at the same time, its capacity has been increased. Equally important, "short meats"—those that have been overheated and lost their binding properties—are no longer produced. Grinders equipped with ordinary cast steel knives commonly heat up the meat after they have been operating for some time. And when this happens, the cell structure of the meat breaks down, thereby releasing the juices.

These knives also help the meat to retain its albumen content during grinding. Because of this, moisture is picked up more uniformly in later processing in the silent cutter, with the result that the quality of the finished product is better.

Design of Knives Improved

The knives we use were developed by F & M Associates, Wexford, Pa., after several years of experimentation. This company's goal was a knife that would remain sharp for a long time. So a search was made for a metal alloy that could do the job. Many such alloys were tested for cutting-edge performance before the answer was finally found in Carboloy—a cemented carbide.

This alloy was selected because of its extreme hardness, which enables the cutting edges to retain their sharpness over a longer period. The hardness of this alloy is 94 plus (Rockwell test), as against the 30-35 test of ordinary cast steel cutting edges.

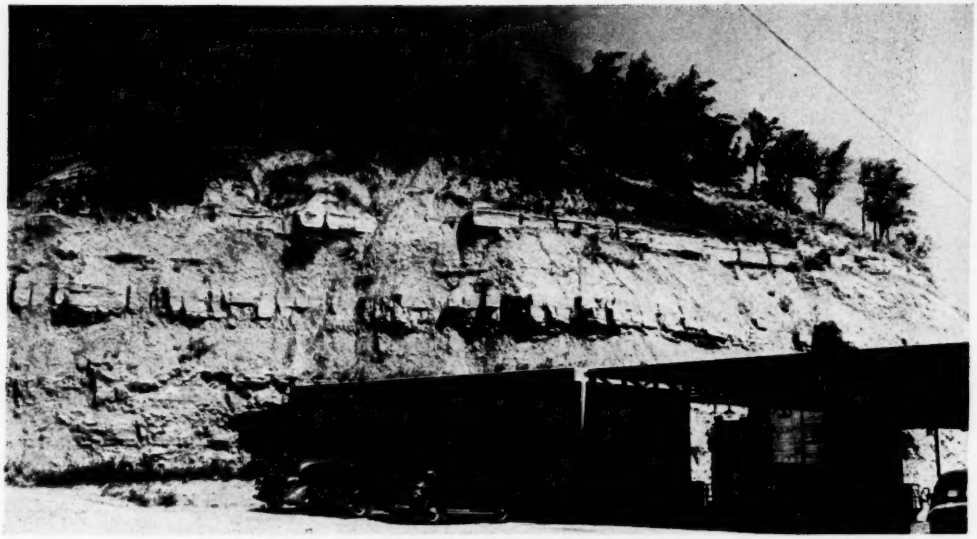
These cutting edges are brazed to the base of the knife, rather than screwed onto it. With this construction, the cutting edges cannot get out of line with the grinder plate while the machine is operating.

Cutting Arms Narrower

The design of the knife differs in that it consists of a stainless steel base with cutting arms that are smooth, tapered, and narrower than the usual knives.

The smoothness of the metal makes it easier to keep the knife clean. For another thing, amino acids liberated from the meat during the grinding operation do not corrode the knife and the castings. Nor do steam and water rust the knife or dull the cutting edges.

Taper to the back of the arms cuts down the drag on the motor and on the worm of the grinder. The narrow arms help keep the meat cooler during grinding.



1 **ENTRANCE** to Atchison Natural Cooler—called world's largest storage space on one floor. Quarrying carried on since 1886 at this site near Atchison, Kan., left an enormous cave. USDA converted it for wartime food storage.

3 **TRAIN** of six carts leaves dock and enters cave. Natural temperature inside the cave is 50-55 deg. F.

4 **MOTOR TRUCKS** are electric, thus there is no monoxide hazard. Here, train passes barrels of dried egg.

USDA Operates Huge Storage Cave as Emergency Stand-By

TODAY, 3½ years after the Japanese surrender, the question is asked, "What is the government doing now with its big wartime underground warehouse out in Kansas?"

The photos above give the answer: USDA is keeping it going in stand-by style, ready for immediate capacity use—just in case. The government considers this good insurance, since a new national emergency might again put a premium on stockpiling space. And in event of a new war, the subterranean protective factory might well be an asset.

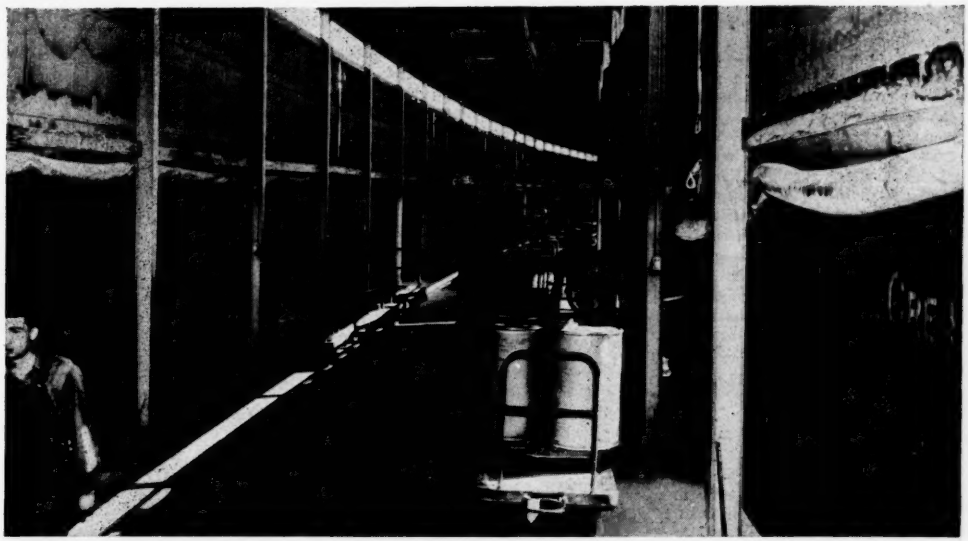
The story began back in 1944. Food storage space on the grand scale was a pressing need when America was bending every effort toward victory. And so the government fitted out the Atchison Natural Cooler—an immense, 7,450,000 - cu. - ft. lay-away facility fashioned out of a huge limestone-quarry gallery.

Currently, the cooler is storing only about 700 of the several thousand carloads of surplus foodstuffs which USDA must by law acquire and physically possess. As for costs, the policy is to maintain the cooler at an approximate "break-even" or slightly better.

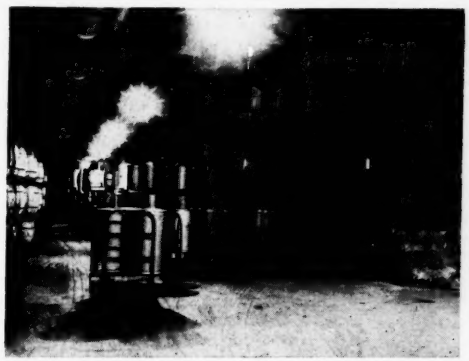
The Kansas facility's maximum capacity is gaged at 3,000 carloads (depending on type of items and the way they are packed). Commodities now stored are potatoes, dried eggs, and powdered milk.

Commercial Viewpoints

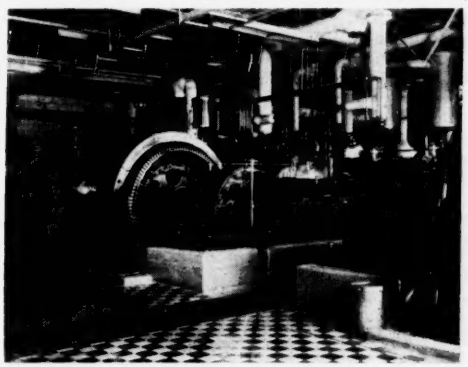
Those are the simple facts. Now for the complexities: While commercial cold storage men have come to recognize the emergency values cited, they nevertheless believe that it is more economical for the government to use available commercial-cooler space for current surpluses, and they think the



2 **STRUCTURE** outside entrance comprises 500-ft.-long loading and unloading dock which accommodates 20 freight cars at a time. Here, drums of non-fat dried milk solids come off cars and are palleted on carts to go in cave.



5 **CARTS** reach milk-storage area. Note unmined-limestone pillar support (right) and air ducts on ceiling.



6 **THIS** is compressor room. Refrigeration system and blower unit are employed. Air is changed every 24 hr.

policy of the government competing with them is open to question.

Moreover, they also term it impractical for any commercial organization to take over a facility of this kind—first, because only the government would have need for such huge storage space; second, because a commercial warehouse, to be practical and profitable, must be in, or near, the city or metropolitan area served. The closer to its customers, the better the competitive position.

In addition, this type of project involves difficulties which cannot be discounted, despite the fact that the space is ready-made and affords a natural 50-55 deg. F. temperature.

Since the Atchison cave is at a considerable elevation and situated away from the highway, a special road had to be constructed to it. And much time and labor was consumed in handling of construction materials by tractor and elevating devices. The government installed $2 million worth of refrigerating equipment. Concrete floors had to be laid, and the walls patched.

Humidity Poses a Problem

With almost any known cave, transportation and materials handling difficulties would plague the project. Then, too, there is the factor of high humidity. Natural earth moisture is usually present in caves, and some are affected by run-off of water from surface storms, making humidity difficult to control. What's more, vermin in the soil and various rodents are common menaces to the foods thus stored.

It is hard to maintain precise storage conditions when so many uncontrollable variables are present. At the Atchison cooler, there is no positive humidity control except by refrigeration and changing of air (once every 24 hours) by a blower system. The humidity varies between 60 and 85 percent under operating conditions.

But the problems of commission are not insurmountable. And it remains that the big Kansas cooler stands ready, if and when—with millions of cubic feet of storage space available on a moment's notice.

Photographs by Harris & Ewing

Choose the Proper Colors

—*Continued from page 90*

be in focal ivory or focal white to increase visibility. As in all industrial plants, the controls, handles, and levers should be in focal orange and all electrical switches in focal red.

Color for safety should be the watchword in slicing and wrapping equipment. Such machinery has innumerable moving parts, each of which might be the cause for an accident, hence these parts should be highlighted in focal colors. Conveyors and mobile equipment, such as moving trays, dough troughs, dollies, and the like, need some color for identification and warning. These can employ colors such as focal orange and focal yellow, with bands or stripes of these colors.

The treatment of the walls, ceilings, and floors of the food plant is dependent upon a number of factors, such as size, location, and type of exposure. Generally speaking, the interior of a plant should be as bright and sparkling as possible without creating a visual hazard for employees. Where the production area has a northern exposure, a suntone can be used on the ceiling to assist in the proper diffusion of light. If the ceiling is too low, a cascade blue can visually increase the height.

In using color to change the apparent physical proportions of a room, a knowledge of the basic characteristics of color is needed. Light shades tend to make an area more spacious, while dark shades make it more compact.

The floor should be in some light color. In large-size plants where mobile equipment is used, traffic aisles should be marked off on the floor. Zone-marking orange is advised.

This same color can be used in the shipping, loading, and storage rooms to mark off various areas. Another use in shipping areas is the light-color painting of boxes, carriers, and other containers which employees handle. This makes the containers appear to be lighter in weight.

In planning the color scheme, it must also be kept in mind that all colors are affected by light, and certain ones materially assist in illumination by possessing more reflective or diffusing powers than others.

The light produced by the daylight fluorescent units is cool with a fairly blue hue, making it best for use with blues, blue-green, and blue-violet. If other colors are used with daylight units, they will be affected in much the same manner as adding a small amount of blue pigment to the colors. Thus, any colors in the orange range would prove unsuitable, since blue is the complement of orange and would give them a muddy appearance.

The white and soft-white fluorescent units produce a warm light tending more toward the red, with the soft-white producing the warmest hues. This characteristic makes them most adaptable to stores, where warm color such as ivory, cream, beige, rose, or tan are used. They should not be used with the green shades, because red is the complement of green and the green would become a dark gray.

In view of the fact that each plant presents a separate problem insofar as color is concerned, it is difficult to draft an overall prescription.

Nevertheless, the fundamental patterns outlined in this article will enable the food processor to recognize the values to be gained through color dynamics and will point the way to proper applications in his operations.

—End—

Production Engineering

—*Continued from page 71*

The program, thus far, is just a good start. There is still much to be done. A program of this type cannot remain static and still be of benefit to the company. In general, it is to be broadened in all directions.

The job-evaluation phase is to be reviewed. All job descriptions will be checked and all necessary changes put into effect. Those jobs that have changed will be re-evaluated and placed in their proper labor grades. The entire wage structure will again be reviewed and compared with area rates. Sound, equitable wage rates are essential to successful wage incentive application and employee morale.

The supervisory and employee training program will be extended. A series of training conferences will be given once a month for personnel—from the management level down to plant superintendents. The same material will be presented to key employees who act as seasonal supervisors during the packing season.

In addition, training sessions are to be given to the various department foremen and supervisors of the operations in their specific departments. As an example, the warehouse foremen of all seven plants will be given a training session on warehousing technics. On-the-job technics will be developed.

Methods analysis and work simplification on projects will be the responsibility of department heads. Each is to see that his department cooperates in the acceptance and installation of the program. The many suggestions which have been made will be investigated. Worthwhile improvements will be considered for installation.

It has been found that the employee suggestion system fits in very well with the production engineering department methods analysis work. For this reason, the administration of the suggestion system has been added to the functions of the department.

The work measurement and wage incentive phase will be extended to include all seasonal operations. Moreover, all packing standards will be reviewed during the off-season months, with revisions due to methods changes noted and set up for restudy in the beginning of next year's pack. A form of standard elemental data will also be established in order to simplify the problem of setting additional standards and studies.

Finally, production engineering department personnel will be further trained for key jobs in the department when the program is extended to other divisions of the company.

—End—

Supply Plus Engineering

—*Continued from page 75*

to deliver the sirup to the mixing room.

The tanks themselves are completely enclosed in walls of hollow tile. A uniform temperature is maintained in the space around the tanks by means of steam coils. This assures storage of the sirup at the proper temperature for pumping, and with adequate sanitation.

The effort to insure maximum safety for employees has brought about almost as many applications of engineering as has improved processing. Partly for safety, the plant is divided into sections separated by fire doors. All stairs and sloping passageways have carborundum treads. Freight and passenger elevators are equipped with safety gates. All moving parts of machinery are covered.

The hinged covers on flavor-mixing tanks are heavy. They are raised and lowered regularly. Formerly, they were a potential accident hazard when raised, since they might slip from the employee's hand and come crashing down. This hazard was removed by placing hydraulic checks on all lids (see Chart A). Now the lids can be raised easily, but come down so slowly they are harmless.

Modernization in a progressive plant never ceases. Technology must move ahead to keep well in advance of process obsolescence. As it does, advanced engineering takes over. There are plans ahead at Abbotts, some reaching installation stage, some still on the drawing board, others in the laboratory. One imminent improvement is a new continuous pasteurizing system.

We Think . . .

▪Processors and Equipment Makers Should Note This Trend

In our February issue we reported that food processors plan to spend $525 million this year, and about the same next year, for new plant and equipment. This means that rapid improvement of the production facilities of the industry will continue. It also means that each processor must keep up with this "parade" or lose out to competitors through higher cost operation or lower quality—or both.

A breakdown of the planned expenditure increases its significance. Some 78 percent will go for modernization, as against 69 percent last year. This means even more emphasis on higher efficiency.

We believe equipment manufacturers, too, should take particular note of this trend. Not only should they develop more equipment which will reduce the processor's costs, but they should do a better job of telling the processor what present models will do in this direction. We say this advisedly, after visiting a couple of very large equipment shows. That little emphasis was put on the cost-cutting possibilities of the machines exhibited was quite noticeable.

For the mutual benefit of food processors and equipment makers, we urge that the latter tell the former what cost reductions are possible. They should do this through all of the media which they use to bring their machines to the attention of the industry.

In a period of declining prices, it is more difficult than ever to make a satisfactory profit in a highly competitive industry. That, plus high costs in all phases of food plant operations, makes cost cutting highly important.

▪Pilot Plant May Avoid the Death of a New Product

Accounting has traditions and practices for which there sometimes are no satisfying explanations. Certainly some of these practices are arbitrary and seemingly remote from the realities. And in times of declining prices, the accountant has much to say that is not always wholly justified.

Take a new product—one in pioneering stage—for example. The accountant usually loads the product's factory cost with all the various categories of overhead. Then the sales department adds its quota of expense and margin for profit.

Maybe the new item can be sold at the calculated price; maybe not. In the food processing industry, the burden of too high a price may spell immediate commercial doom for the product. In certain fields, high price is not so serious, but in foods there are always plenty of other things to eat.

How to get a fair market test? Accounting says the new item must carry all the burden—or else. In some concerns, the accountant's authority is so strongly entrenched that there is no way out, except by a devious route.

Here's a secret—shhh! The accountant has not yet discovered the pilot plant. Companies that have pilot plants can, and do, produce and sell moderate quantities of foods and byproducts without the full load of corporate overhead ordinarily imposed.

Of course the idea sounds screwball—only it isn't. The pilot plant has many uses!

▪To be Effective, House Organs Need More Than Chit-Chat Items

What is the purpose of a house organ? Is it for the benefit of the employees or is it merely to please the top management? Or has it some other purpose? Judging by many examples, it would appear to cater only to the average person's satisfaction at seeing his name in print. Deaths, marriages, engagements, promotions, golf and fishing prowess are the principal sources of news. These seem to us to be a rather insubstantial basis for any publication.

Some company publications give excellent discussions of the manufacturing processes employed in the plants. This is an improvement over the minor chit-chat type of house organ. Relatively few come to grips with the fundamental problems existing between the employee and his company.

Those who direct the policies of company publications should prepare a clear-cut written statement of the purpose to be attained before they attempt to dictate the manner of its attainment. Let them examine the most influential newspapers to see what a small proportion of the total space is devoted to society, deaths and promotions—and what a large proportion is devoted to the larger economic and political questions of the times.

Each type of news has its place, to be sure, but an influential publication cannot be built solely on the out-of-business-hours circumspect lives of the mass of humanity.

▪Technologist Plays a Key Role in Food Company Finances

If you want to know where your industry and your company stand in the eyes of the outside business world, just ask a shrewd banker for a sizable loan. If he says no, perhaps you better take stock of the situation.

Loans are based on these points: Sound management, proper organization and control, good product quality, well-established trade names, and proper distribution outlets.

In evaluating a new industry, the banker has to type that industry with one already well established. Thus the frozen food business was typed with canning. And the banker must be able to determine the volume, quality,

and economic position of the product before packing ends.

It is testimonial to the clean-up job done in the freezing field in the past two years that a leading bank considers it to entail no more than ordinary risks. This confidence will mean much to an industry which looks forward to a sound and healthy growth.

A second large bank considers the frozen food business to have passed through the period of experimentation and to be in the period of sound, long-range growth. Still a third financial institution puts it in this way: "The banker no longer confuses frozen foods with frozen assets."

A fourth bank offers some very sound advice. It believes that the frozen food industry needs a sound, flexible, integrated operation; and, further, that the packer ought to get enough permanent capital so he will not fail with his first adverse experience.

The emphasis which bankers place on good product quality in evaluating a food-industry risk is both significant and healthy. Certainly, it ought to increase the importance of the food technologist in the eyes of management.

▪ Utilization of Surplus Crops Challenges Industry

In 1880—when the population of the United States was 50 million people—the potato acreage was about the same as that last year. But in 1948, the yield per acre set a record, providing nearly 450 million bushels of the tubers, much more than was needed and nearly three times as much as produced in 1880.

Inevitably there arises a problem of major magnitude. This problem is much greater because people now eat far fewer potatoes per capita per year than their grandparents did. Three grandchildren do not begin to consume the 212 bu. per acre, which yield is 50 percent greater than the average for the preceding decade. So people in the Government hope that food technology will help to solve the problem through the production of potato flour.

Offered as a step in that direction is a new process which converts whole potatoes into a slightly gray flour which has high dietetic value. There seems little doubt that a considerable quantity of such flour might be made in idle equipment. But we doubt whether the American consumer will absorb much of this low-grade flour. European food relief, of course, offers one outlet.

Surplus problems such as this present a challenge to the food industry. Unless we find some solution, there may be no alternative to the spending of millions for price support of numerous surplus crops.

It's a big and stimulating assignment. Helpful results are likely to come in most unexpected ways. All of us must be alert to the responsibility so that we will recognize even fragmentary gains in new technology when we see them. Some of these gains may result in substantial industrial profit. Any gain will afford tax relief by preventing some parts of the price support spending by Uncle Sam.

▪ The "End" May Not Justify the "Means" in New Legislation

Controversies in Congress this year will deal both with the objectives sought in law making and with the routes to be used in reaching the goals. President Truman has set up a great many principles which he wishes to apply by new laws or new appropriations. Many will commend his objectives who cannot approve the proposed legislative routes. If we exert our influence on legislation—and each of us has some influence—it is important to distinguish in our own minds, and in our arguments, between these two phases of law making.

All of us would like the members of Congress to vote the millennium into immediate existence. Similarly we would like to have every proper element of society benefited. But the means for accomplishing these desirable ends, even if they were attainable, do not command unanimous support.

It is interesting to know that the most progressive members of the Republican leadership are undertaking to make distinctions of this sort. One of the more influential of the policy makers in the Senate is talking and striving for what he calls "intelligent opposition" to the Truman "Deal." Whether we be Republicans or Democrats, we can wish this distinguished Senator good luck in his effort. We hope that it will eliminate the fantastic, the radical or the impracticable which costs more than it is worth. We can also hope that the opposition so formulated will be constructive and not merely obstructive.

It will do a bit of good if each of us will think through these matters as they relate to any important legislation in which we individually or collectively may have a particular interest.

▪ Fumigant May Help Middle East If Reinfestation Is Avoided

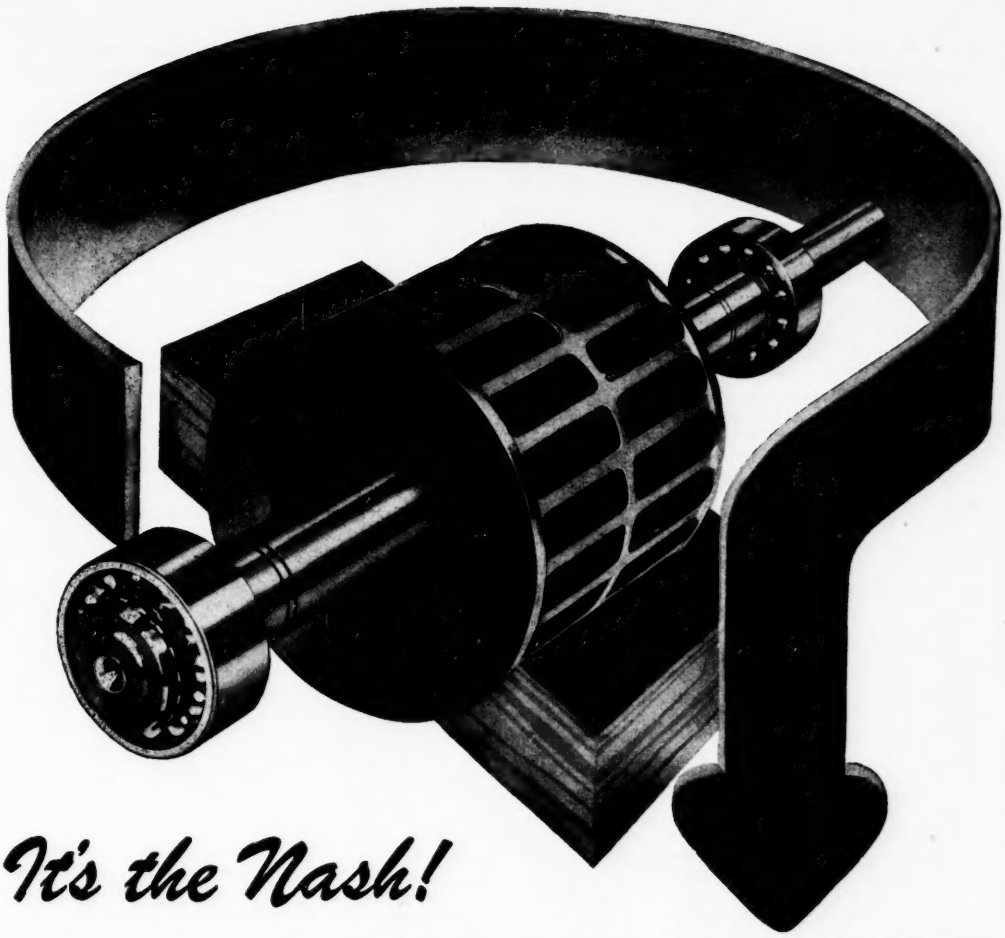
A few years ago it would have been most gratifying to learn that Near Eastern countries had been studying the protection of their grain reserves from destruction by insects. And it is significant even now, when world hunger is momentarily less serious, that Egypt has a new fumigant, methyl allyl chloride.

The hint of its existence is found, of all places, in *Analytical Chemistry*, 20, 1078, 1948, where Shafik Ali El Khishen reports on methods of determination of the fumigant in grain. The subject is interesting because of reports that occasionally reach America of the losses of cereals by insect destruction in the hot countries. One such tale by a visitor from India has it that—if memory serves—India loses 400,000 tons of grain annually to insects alone.

Such a loss, in the vicinity of 13,000,000 bu., would not account for famine conditions. But it occurs year after year because no effective efforts are made to stop it.

To be sure, India and Egypt are far apart, and one cannot safely predict how rapidly technical discoveries will move from one to the other. Yet it is gratifying to learn that these agricultural countries are doing something.

They must learn more than how to fumigate, however. The next indispensable step is to protect the grain from reinfestation once it has been freed from insect life. This will require either insect-proof grain storage or bulk packages. The best fumigant in the world does not impart continued protection by chemical means. Only a mechanical insect-proof barrier can do that.



It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

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COMMITTEE responsible for the All-Industry Frozen Food Convention—from left: F. M. Deutsch, Marathon Corp., exhibitors' representative; F. J. Becker, packers; W. M. Walsh, distributors; W. M. White, director; E. M. Burns, warehousing; T. N. St. Hill, preservers; and Watson Rogers, brokers.

Frozen Food Groups Join Forces

Entire industry is represented in problem discussions involving processors, distributors and preservers

Greater standardization of product and further decentralization of production areas received the formal blessing of the frozen foods industry at its third annual convention, held last month in Chicago. Presenting a united front, the industry's three major groups—packers, preservers and distributors—aided by the brokers and equipment suppliers outlined a broad general program before settling down to discuss some of the more detailed group and inter-group problems.

This program, intended to eventually build the industry into direct competition with not only fresh foods but also canned food products, was designed to serve as an overall guide: 1. A broadened program of quality improvement and standardization. 2. Continued decentralization of production areas to insure the utmost economy in costs of transportation. 3. Improved packaging, with emphasis on the development of containers providing maximum eye appeal, to take advantage of the impulse buying habits of the American housewife.

Adding another aspect to the trend in decentralization, Fred J. Becker, president of the National Association of Frozen Food Packers, pointed out that regional crop failures need no longer materially affect production. Until recently, he said, 60 to 70 percent of the major frozen food items, particularly fruits and vegetables, were produced in three states—California, Oregon and Washington. Obviously a poor crop year in this area meant a serious blow to the whole industry.

By its decentralization program, Mr. Becker continued, by cost and carryover studies and by surveys on consumer demands, the industry is getting onto a scientific production and marketing basis. The rate of consumption, he said, continues to push high. The total pack in 1948 was approximately 1,125,000,000 lb., about 120,000,000 lb. more than was turned out in 1947. Fruits and vegetables accounted for 66 percent of the total, 375,000,000 and 370,000,000 lb., respectively.

Frozen vegetable consumption, said Mr. Becker, increased more than 20 percent during the past year, while frozen fruit sales were up 35 percent over the 1946-47 season. Housewives are showing preference for strawberries, raspberries, peaches, cherries, and winter vegetables.

The quality of cold pack fruit delivered to preservers, came in for some adverse criticism in the talk by T. N. St. Hill, president of the National Preservers Association. He declared that this quality has suffered as the demand for quick frozen fruits in consumer packages has grown. He said the preservers have been particularly disappointed in the "Grade B, for Manufacturing" strawberries supplied by the packers. The standard Grade B, on the other hand, seems to be reasonably satisfactory for preservers.

Mr. Hill also emphasized the importance to the preserver of having every ingredient specified on all bulk packages going to the industrial user.

Two problems of basic importance to the entire industry were broached by William M. Walsh, president of the National Wholesale Frozen Food Distributors Association. Education of the retailer as well as the housewife, was his first consideration, and the present high cost of frozen foods to the consumer, his second.

He described the retailer as "a very weak link in the chain of knowledge about our products." He told the packers they would be appalled to see the way their quality products are "kicked around" in the retail frozen food cabinet.

Mr. Walsh called upon all the groups represented at the meeting to take a hand in this educational process by providing funds and all educational facilities necessary to carry out a properly directed publicity program. Costs, an even more difficult hurdle, must be cut through greater efficiency all along the line so that the frozen foods can be brought within the range of mass consumers. Today, he said, they appeal mostly to people with higher incomes.

He further called upon all groups to join with the distributors association in its plans for holding a Frozen Food Exposition in New York City next year. Opened to the general public and retailers, this exposition, he said, could be a true industry promotion effort on a huge scale.

Standards of identity for frozen fruits and berries were brought up in the panel discussion on packers' problems. John McVey, NAFFP counsel in Washington, spoke of the recent hearings on standards and called attention to the fact that if standards do not permit the loss of fruit juice during processing, it means the end of frozen packs in these commodities. He also objected to standards written in terms of manufacturing procedures rather than in terms of the finished

NAFFP Officers

President: A. J. Rogers, Traverse City, Mich.. First Vice-President: E. J. Watson, Mt. Vernon, Wash. Second Vice-President: C. O. Bailey, New York, N. Y.

Preservers Officers

President: R. J. Glaser, Chicago. Vice-Presidents: C. R. Zimmermann, New Brighton, Minn.; Charles Kern, Los Angeles; Albert J. Knights, Malden, Mass. Secretary-Treasurer: Lloyd H. Smith, Kansas City, Mo.

product. Such a proposal, he said would have the effect of putting the industry into a straight jacket, since no new process could be used.

Research in the frozen food industry has lagged, in the opinion of Prof. Ernest Wiegand, Oregon State College. There is a tremendous amount of research to be done, he said, even though modest progress has been made. Professor Wiegand thought that the industry might be putting too much dependence on canning technics and methods, which are not always applicable to frozen foods.

Next year's convention, it was decided, would again be held in Chicago, on dates closely following the National Canners Convention. The 1950 gathering will again be a joint meeting of all industry groups. It will be held at the Congress instead of the Stevens Hotel, the scene of this year's meeting. William M. Walsh will be chairman.

Bakers Study New Technics

Ingredient variations, equipment care and adjustment, and handling advances hold engineers' interest

Produet quality and improved production practices keynoted the program of the 25th Annual Meeting of the American Society of Bakery Engineers, held last month in Chicago. Both laboratory studies and commercial experiences were outlined and discussed in the more than 30 papers presented.

Factors considered ranged from effect of ingredient variation to care and adjustment of equipment and to handling and packaging of finished product. In all, effect upon quality of the finished product and its relation to the consumer's preference for one product over another product were emphasized.

Charles De Brower, American Dry Milk Institute, Chicago, reported results of laboratory studies in which individual factors were varied for each series of baking tests. The variable factors were fermentation and proofing times, dough temperatures, absorption of water content, yeast, salt, sugar, shortening, dry milk solids and yeast food. The object was to determine quantitatively the conditions and ingredient percentages which, individually and in combination, have a determinable and reproducible effect on bread quality.

J. Paul Olmsted, Lubbock, Tex., summarized his commercial experiences and observations, recommending the use of 2 percent shortening, 6 to 9 percent dry milk solids, 0.75 percent yeast food, and 2 percent yeast, calculated on weight of flour used.

Rodger P. Hopper, Swift & Co., Chicago, and Henry H. Favor, R. T. Vanderbilt Co., Inc., New York City, discussed effects of mono-glyceride and polyoxyethylene stearate, respectively, upon softness, tenderness and keeping qualities of bread. Laboratory data and charts were presented to show effect of mono-glyceride, with and without the addition of lard, upon tenderness as determined by a Scott tensile tester and upon softness or freshness as determined by the Bloom gelometer compressibility test and by X-ray diffraction.

Addition of 4 percent monoglyceride concentrate indicated a 3-day delay in appearance of initial staling and a 6 to 8 day extension of freshness when compared with addition of 4 percent lard.

Factors affecting machinability of bread doughs were cited by R. W. Selman, C. J. Patterson Co., Kansas City, Mo., to be: Time, temperature, measurement, materials used, and human error of judgment.

These factors, it was stated, come into evidence at the mixer. Instruments for control over them are grouped in the classification of scales, clock and thermometer. They include automatic and recording mechanical devices such as the recorder on dough mixer, Swanson viscosimeter and Brabender farinograph, which aid in measuring effect of variations in ingredients and mixing conditions as well as variations in flour strength upon bread quality. These devices are open to criticism in that they do not duplicate conditions in commercial mixers. The Bailey recording wattmeter is stated to overcome the criticism. It is attached to commercial mixers to supply data that can be interpreted in terms of dough conditions and bread quality.

In the course of discussion of principles in machine molding, conventional molding vs. loose-curl cross and straight molding, attention was called to the use of plastic rolls as an aid in overcoming molding difficulties and in cutting down the percentage of "crippled" loaves. Replacement of high carbon steel by plastic or plastic-covered rolls eliminates the use of scrapers and heating of rolls, sticking of dough to rolls, and trapped air, by making possible a thinner sheeting and degassing of dough without tearing and without excessive use of dusting flour. Uniform, controlled feeding of doughs from overhead proofer to molder was included among the essential factors in satisfactory molder operation.

Semi-bulk handling of flour from mill to bakery and to production department was viewed from standpoint of the flour miller, bakery operator and the equipment manufacturer. It was described as an expensive method of materials handling, which has been developed over a period of 10 years and used experimentally on the Pacific Coast during the past two years and in Minneapolis during the past few months. Advantages in saving of flour dusting and manual labor in promotion of good housekeeping and sanitation and in flour uniformity for moisture content and temperatures, offset the disadvantages of investment cost, required storage space for filled and empty portable bins, replacement of existing flour-handling equipment and necessity of flour miller to pack both 100-lb. sacks and semi-bulk bins.

Savings in the bakery were reported to be more than 50 percent in time and 50 percent in manual labor for transfer of flour from truck or freight car to storage, 1 to 2 percent in flour loss through elimination of dusting, and 1 percent in weight loss through change in moisture content.

Observance of good sanitary and housekeeping practices were declared by J. Carl Dawson, St. Louis, and Edward R. Holmes, American Institute of Baking, Chicago, to be more important than the use of insecticides and other accessories or supplements to the practices. The basic principles of good practices are: 1. Denial of food and shelter to invading insects and rodents, 2. installation of thorough and systematic cleaning program, 3. replacement of wooden structures with metal, 4. practice of off-floor and movable storage, 5. inspection and treatment of incoming raw materials and supplies, 6. disposal or out-of-plant storage of discarded equipment, 7. training of plant personnel and putting sanitation program in hands of a responsible individual, and 8. use of insecticides, fumigants and rodenticides.

In the discussion on packaging, Gor-

ASBE Names Officers

President: Harold T. Moody, Ralph's Grocery, Los Angeles.
1st Vice-President: Don F. Copell, Wagner Baking Co., Newark, N. J.
2nd Vice-President: Glen E. Hargrave, Mt. Prospect, Ill.
Secretary - Treasurer: Victor E. Marks, Chicago (re-elected 25th time).

don Dilno, Laminated Bakery Package Research Council, Kalamazoo, Mich., emphasized the protective, convenience and re-use values of laminated packages made with 3-layer construction in as many styles and sizes as those of non-laminated board. Particular attention was called to the moisture-vapor and grease barrier properties of the inner lining film, supplemented by the micro-crystalline wax film functioning as an adhesive between the inner lining and the outer cardboard. Laminated packages—introduced three or four years before World War II, but shelved during the war — have greatly increased in use since VJ day.

In recognition of his 25 years of service to the Society, Secretary-Treasurer Marks was presented with an executive desk set by the Past Program Chairman, with a sterling silver service set by the Past Presidents, and an 8-cylinder 1949 Chrysler by the membership, now numbering 2,414 as compared with 269 members 25 years ago.

Pickle Research Reported to Packers

Studies on vegetable fermentations, bacteria, and fungi are detailed in two-day session at Michigan State College

Progress reports on research in vegetable fermentations, being carried on at the New York Agricultural Experiment Station, and on the bacteriology and mycology of pickling at Michigan State College and the North Carolina Agricultural Experiment Station, were discussed at the Michigan State Technical School for Pickle & Kraut Packers, at East Lansing, Mich., in February.

Bacteriological effect of alums used to crisp pickles was reported to be negligible, although the bacteria population is greatly reduced by its mechanical entrapment in, and settling out of, the aluminum hydroxide formed when alum is added to the final freshening water. Emphasis was put on the aluminum content of alums as the effective factor in the crisping of pickles and in determining economies of purchase.

Study of spoilage by mold was traced to *Oospora lactis*, which was isolated from pickles that had softened as a result of remaining too long in the freshening tank—four to five days, instead of not more than 24 hours—and from processed dills packed in second-hand barrels previously used for condensed milk.

Summarization of work to determine what occurs in a tank of fermenting cucumbers shows that the addition of NaCl and lactic acid together have an additive effect in retarding growth of spoilage organisms and in permitting the growth of *Lactobacillus plantarum*, chiefly responsible for the fermentation of cucumbers.

The presence of spoilage organisms such as *Bacillus mesentericus fuscus* and *Bacillus vulgatus* appears to be antagonistic to *L. plantarum*. They retard fermentation and result in the development of pectolytic enzymes responsible for softening of pickles. Six species of aerobic spore-forming bacteria, which reduce the oxidation-reduction potential of the pickle medium, were isolated from spoiled pickle brines. *L. Plantarum* has little or no effect on the oxidation-reduction of the brine.

This study was to determine the possible relationship between the presence of the different bacteria in pickle brine and the spoilage of pickles.

Use of quaternary ammonium compounds, in washing cucumbers to reduce microflora content of finished pickles, was shown to be unnecessary with pasteurized cucumber pickles.

Advantages of using essential oils or oleoresins instead of whole spices for flavoring pickles were reported by A. H. Downey, Magnus, Mabee & Reynard, Inc., New York City. They were: Uniformity of spicing, improved sanitation through the use of sterile materials, and lower costs.

Appearance, texture and flavor were cited by Robert Dillman, Libby, McNeill & Libby, Chicago, to be the main bases for judging pickle quality. Factors contributing were:

1. Selection of desirable cucumbers; 2. satisfactory salting practice; 3. selective grading of cured stock; 4. use of high grade flavoring, vinegar and sugar; 5. controlled processing; and 6. protective packing.

Carl S. Pederson, N. Y. Agricultural Experiment Station, identified *Streptococcus faecalis, Pediococcus cerevisiae, Lactobacillus plantarum, Leuconostoc mesenteroides* and *Lactobacillus brevis* to be the important bacteria in vegetable fermentation. The first three species produce lactic acid and the last two likewise produce lactic acid, and also acetic acid, alcohol and CO_2. Other related strains are present occasionally and may be involved in fermentation. Fermentative activity of each organism is dependent primarily upon the degree of acidity that it is able to produce upon the temperature of the surrounding medium, and the salt content.

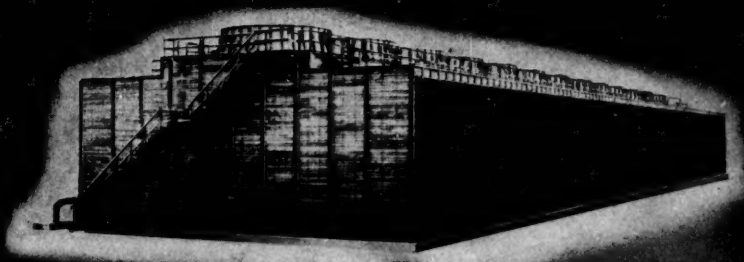
For these reasons, successful fermentation of cabbage to kraut depends upon uniform distribution of 2 to 2¼ percent salt by weight through the shredded cabbage and holding the temperature of the fermenting mass at approximately 65 deg. F. This will result in a slow rate of fermentation with retardation of spoilage-bacteria growth through development of CO_2, acetic acid and lactic acid—particularly by *Leuconostoc mesenteroides* and *Lactobacillus brevis* in the early stages of the fermentation.

Benefits derived from plant mechanization to lower labor costs were emphasized by J. E. Flury, The J. Weller Co., Oak Harbor, Ohio. Walter Wojda, Tree Preserving Co., Buffalo, N. Y., outlined the best procedure found for washing cucumbers. Three steps are involved: 1. Soaking and agitation to loosen dirts, especially clay; 2. rinsing either with or without agitation as obtained in the rotary washer; and 3. spraying with water under pressure of 350-400 lb./sq. in. To get best results, the cucumbers should be spread over a belt surface in a one-cucumber layer.

CHEMICAL ANALYSIS OF PICKLES, 1947-1948, Showing Minimum, Average and Maximum Ranges of Salt, Acid and Sugar.

	Grains Acid As Acetic			Salt Percent			Sugar — Brix			Sugar — Baume			Number of Samples
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	
Fresh Pasteurized & Kosher Dills	3.5	6.7	10.5	2.0	2.9	5.2	....	....	....	....	....	....	55
Process Dills	4.0	8.5	13.0	1.6	4.1	6.2	....	....	....	....	....	....	63
Sour Pickles	18.0	22.9	31.5	1.1	2.8	4.3	....	....	....	....	....	....	21
Low Sweet (Baume 8-17.9)	8.2	20.1	30.0	0.5	2.0	4.2	16.0	28.2	32.5	8.9	15.6	17.9	66
Standard Sweet (18-22)	11.0	20.4	31.0	0.5	1.8	2.7	33.0	35.8	40.0	18.2	19.7	22.0	61
Extra Sweet (22.1-26.0)	19.0	20.0	22.0	0.7	1.7	2.7	41.0	43.4	47.6	22.5	23.8	26.0	13
Bread & Butter & Old Fashioned	7.5	11.7	17.0	0.6	1.8	2.6	15.0	23.6	35.0	8.3	13.1	19.3	34
Low Sweet Slice	8.0	14.7	25.2	0.0	1.9	2.9	10.0	23.9	32.0	5.6	13.2	17.7	14
Standard Sweet Slices	12.0	21.2	31.0	0.7	1.9	2.9	32.5	35.2	41.0	17.9	19.4	22.5	28
Extra Sweet Slices	12.0	19.3	23.0	0.6	1.9	2.7	44.0	46.8	51.0	24.1	25.6	27.8	9
Low Sweet Mixed	10.0	19.4	26.0	0.8	2.1	3.3	19.0	27.8	32.0	10.6	15.4	17.7	36
Standard Sweet Mixed	14.0	20.0	25.0	1.0	2.4	3.3	33.0	36.2	40.0	18.2	19.9	22.0	35
											Total samples		435

Specify MARLEY Double-Flow



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LUMBER . . . only the finest HEART QUALITY REDWOOD is used. All structural members are properly sized and are free from sapwood that is subject to fungus and insect attack.

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MECHANICAL EQUIPMENT SUPPORT . . . massive, corrosion-free wood crossbeams are used to support the mechanical equipment. Diagonal bracing in this area gives added strength.

COLUMNS . . . vertical columns placed on a maximum of six foot centers. Louver posts are machined to accommodate the continual expanding and contracting slip-fit louvers.

BRACING . . . transverse and longitudinal bracing extending from each six foot height to the bottom of the tower.

Each joint and every detail, as well as the major members of a standard MARLEY DOUBLE-FLOW Cooling Tower are guaranteed against a 30-pound wind. The low, wide design of the Double-Flow gives unusual stability.

To be sure YOUR new cooling tower is STRUCTURALLY SOUND, Specify MARLEY DOUBLE-FLOW!

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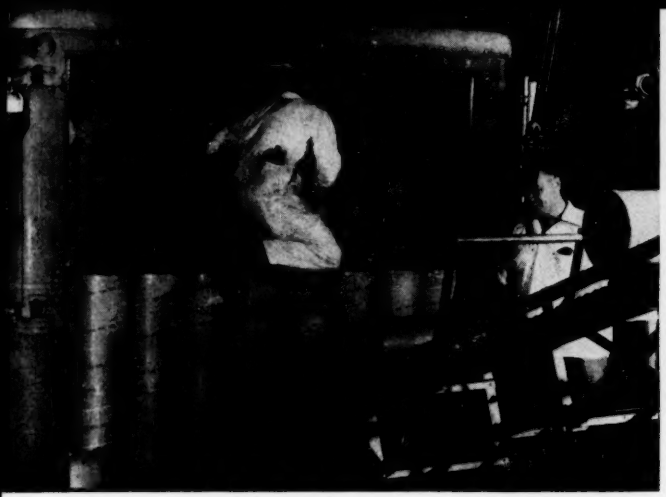
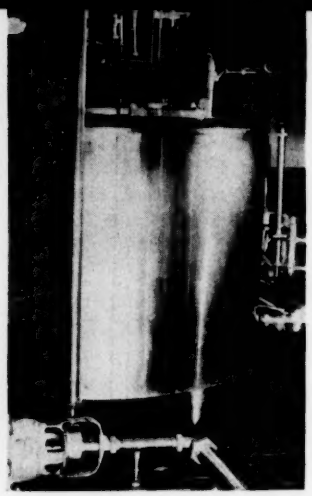


1 **SPECIALLY** designed conveyor moves cans of 80 percent cream from dry ice refrigerated transport truck into —20-deg.-F. storage room.



2 **VERTICAL** stainless steel tanks are used to mix the ingredients.

Ice Cream Production

Advanced processing technics plus special equipment insure highest quality

(Article on page 72)

PRODUCTION methods at the ice cream plant of Abbotts Dairies, Inc., Philadelphia, Pa., combine the most advanced processing technics with the newest equipment obtainable—much of it designed by company engineers to meet needs when no units were available. Many of the processes likewise were developed to meet company requirements.

One of the outstanding developments was the production of 80 percent butterfat cream from Grade A milk at Abbotts' Wisconsin creameries. To guard against loss of its high quality from the time of production until use, this cream is cooled on a specially designed unit, is filled into 5-gal. paper cans, and quickly frozen.

The cream is then transported in dry ice refrigerated trucks to the Philadelphia ice cream plant. Here, the containers of frozen 80 percent cream are unloaded onto chain conveyors—at (1) in fold-out flowsheet, right. Then they are immediately moved into –20 deg. F. storage.

Milk is hauled in insulated tank trucks from collecting stations in New Jersey, Pennsylvania or New York. At the ice cream plant, it is pumped into refrigerated storage tanks, where it is held until incorporated into the ice cream mix. Surplus milk is concentrated in a vacuum pan, and held in refrigerated stainless steel storage tanks.

To provide a continuous flow of mix ingredients through the internal tube heaters—at (3) in fold-out flowsheet—two mix make-up tanks are used alternately. Frozen 80 percent cream, taken directly from the —20 deg. F. storage, is flaked by a specially designed cutter, falls into the stream of heated mix, and is carried to one of the mix make-up tanks.

Finished mix is pumped from the mix make-up tanks to instrument-controlled holding pasteurizers. At the end of the holding period, it passes through strainers to homogenizers, then is cooled on surface coolers. From here, the mix is pumped to refrigerated mix storage tanks. Three separate lines lead from the mix storage tanks to freezers—for bulk ice cream, packaged ice cream, and frozen confections. The flavor preparation department—at (5) in flowsheet—provides flavoring to all of the lines.

Flavors and juices are added to the mix in flavoring tanks. Berries, fruits, nuts, and other solids, are injected into the ice cream after it leaves the freezers.

Freezers are of the continuous type. In the bulk and frozen confection departments, freezers supply only one line, while in the packaged ice cream department they supply five. Two other production lines are required in the packaging department—lines for packaged products made from bricks of ice cream. All products enter the hardening rooms for hardening and storage until delivered.

Orders for delivery trucks or trailer transports are made up in the hardening rooms. These are moved to the loading docks on chain conveyors.

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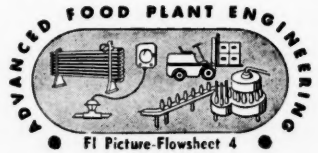
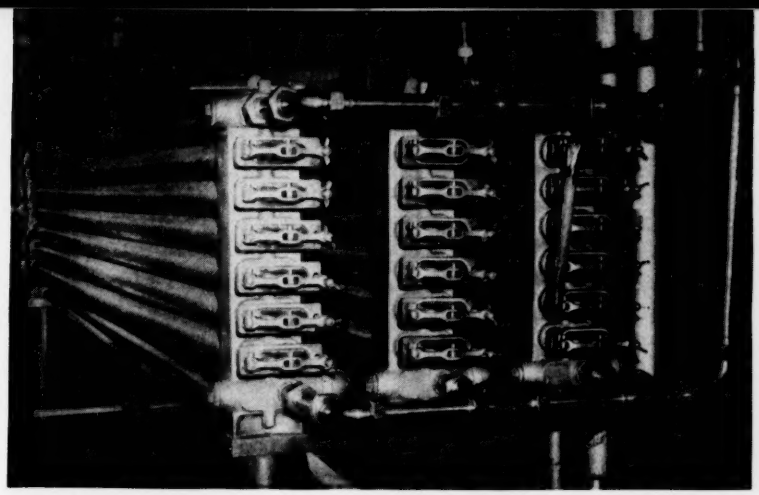
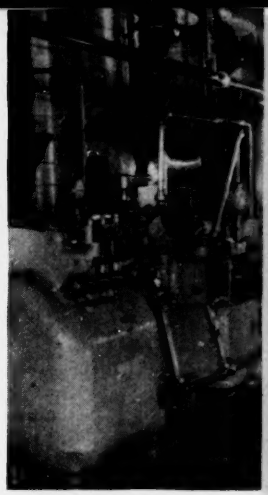
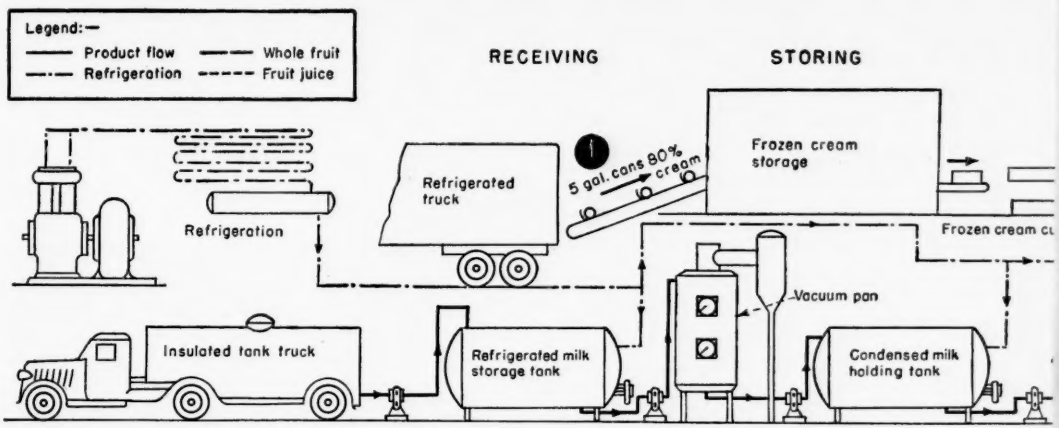




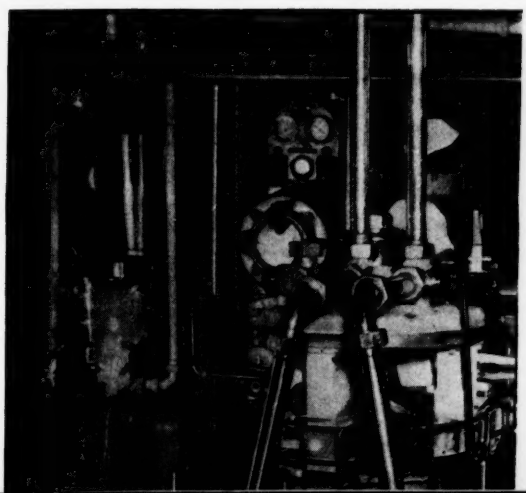
3 **INTERNAL** tube heaters use hot water—are efficient, easily cleaned, and do not expose products to the air. They are used to heat mix ingredients prior to addition of cream.



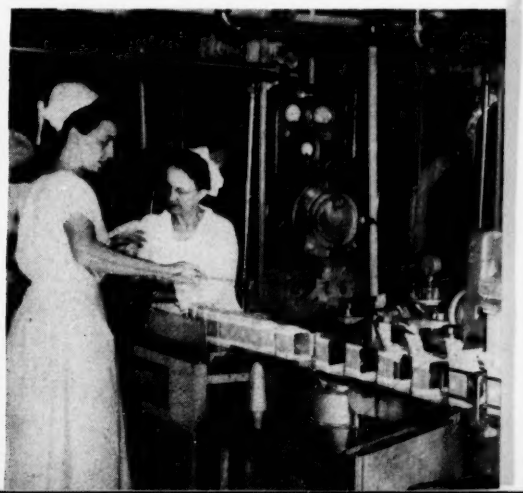
4 **HOMOGENIZERS** (left) brea tion of pressure to mix from

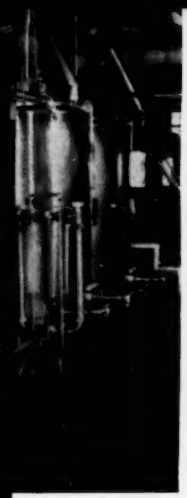


9 **FRUIT FEEDER** (left) introduces whole berries, or large pieces of fruit, into ice cream after it leaves freezer.



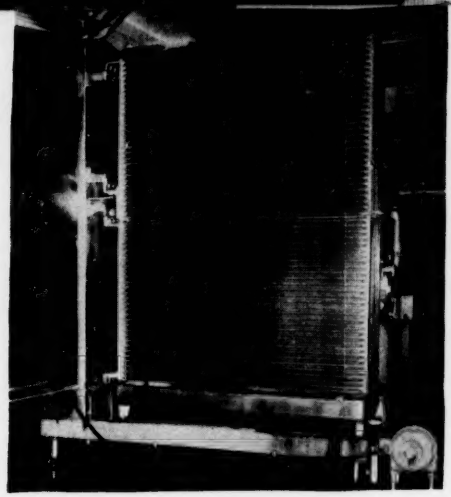
10 **AUTOMATIC** packaging machine forms pint cartons, fill tinuous freezers, with one, two or three flavors of ice cr



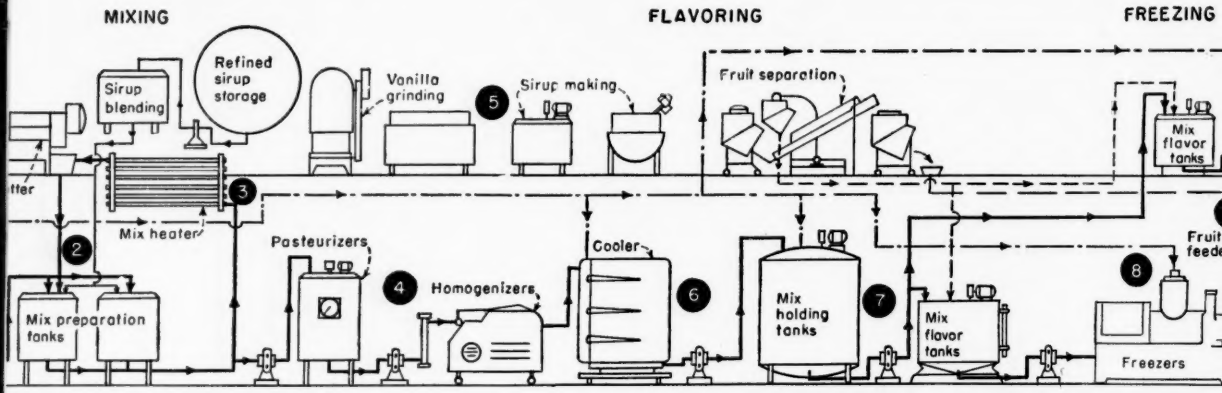


ık up fat by applica-
pasteurizers (rear).

5 **STAINLESS** steel mixing tanks, and steam jacketed kettles (rear), are used in preparing flavoring ingredients.



6 **MULTI-LEAF** cabinet-type cooler has stainless steel plates and hinged covers. Plates swing out book-like.



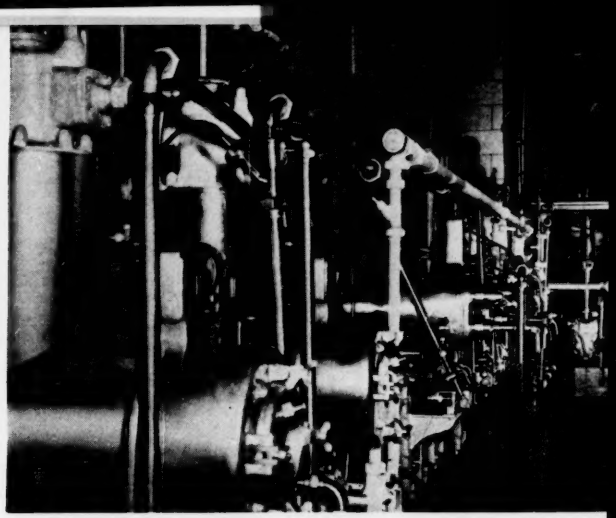
s them directly from con-
eam, then closes them.

11 **SPECIAL** device fills 2½-gal. paper cans with bulk ice cream. Weight of ice cream lowers filled cans to level of table for easy removal.

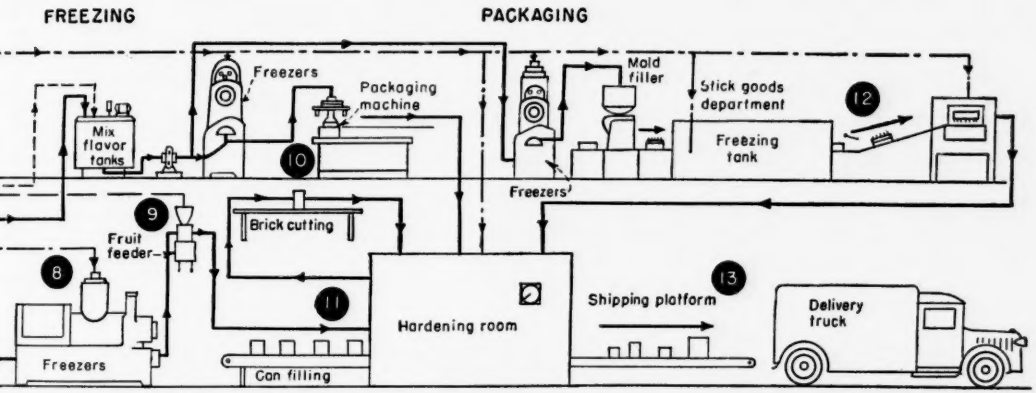
12 **STICK** novelties are coated by dipping
chocolate, then conveyed through dry

stainless steel
g out book-like.

7 **STORAGE** tanks. Instruments control temperature of their contents.

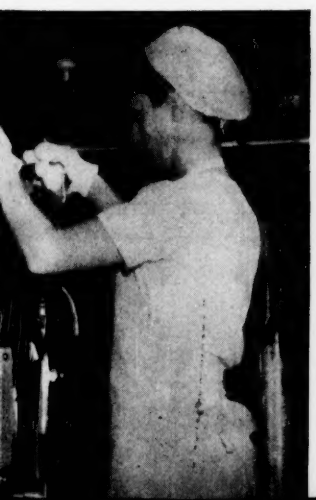


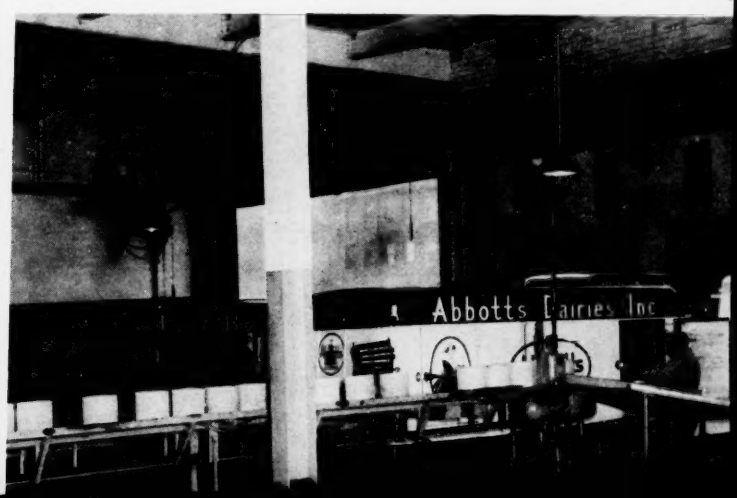
8 **CONTINUOUS** freezers deliver constant flow of uniformly frozen ice cream for bulk, package, and novelty production.



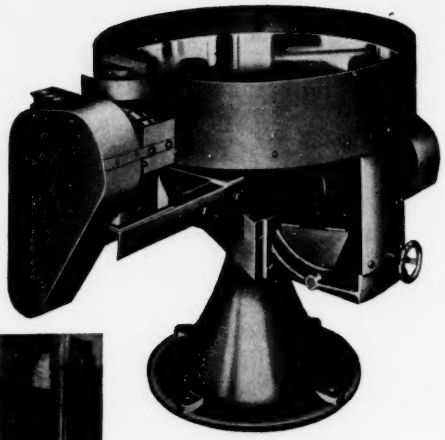
e coated by dipping into pan of melted
veyed through drying tunnel.

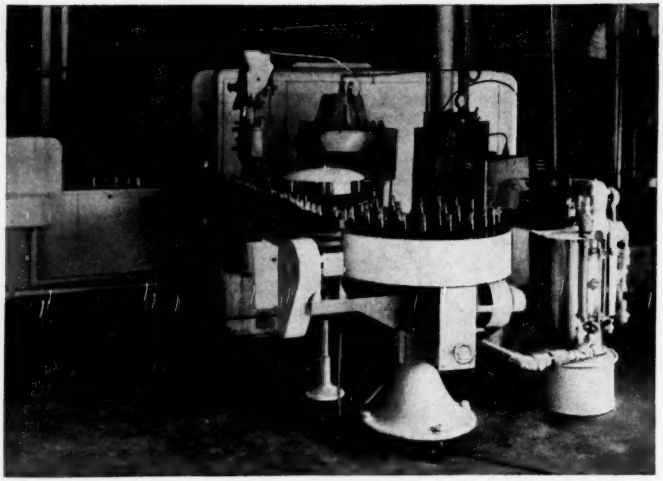
13 **POWER CONVEYORS** move cans of ice cream from storage rooms to loading docks. Arrangement allows for loading several delivery trucks at one time.





THIS ACCUMULATING TABLE IS *Stainless-Clad* STEEL





This soft drink bottling machine is a product of The Liquid Carbonic Corporation of Chicago

- SMOOTH
- CORROSION-RESISTANT
- LONG-LIVED

Bottles crowd onto an accumulating table at a rapid rate, so a long-wearing, highly polished, stainless steel surface is used there by The Liquid Carbonic Corporation. Liquids spill on that table—another excellent reason for that stainless steel surface; it is corrosion-resistant, as well as wear-resistant.

Lukens Stainless-Clad Steel plate provides all these advantages of *solid* stainless steel, but at the lower cost of *clad* steel. A uniform cladding is permanently bonded to the backing plate, giving the necessary structural stiffness.

Lukens wide range of clad steels—Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad—enables you to select the corrosion-resistant metal best suited to your needs. Claddings 10% or 20% of total plate thickness meet most requirements. All are available in the extra-smooth sodium hydride finish.

Bulletins 255 and 338 describe Lukens Clad Steels. For copies, write Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

CLAD METAL STEEL

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Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

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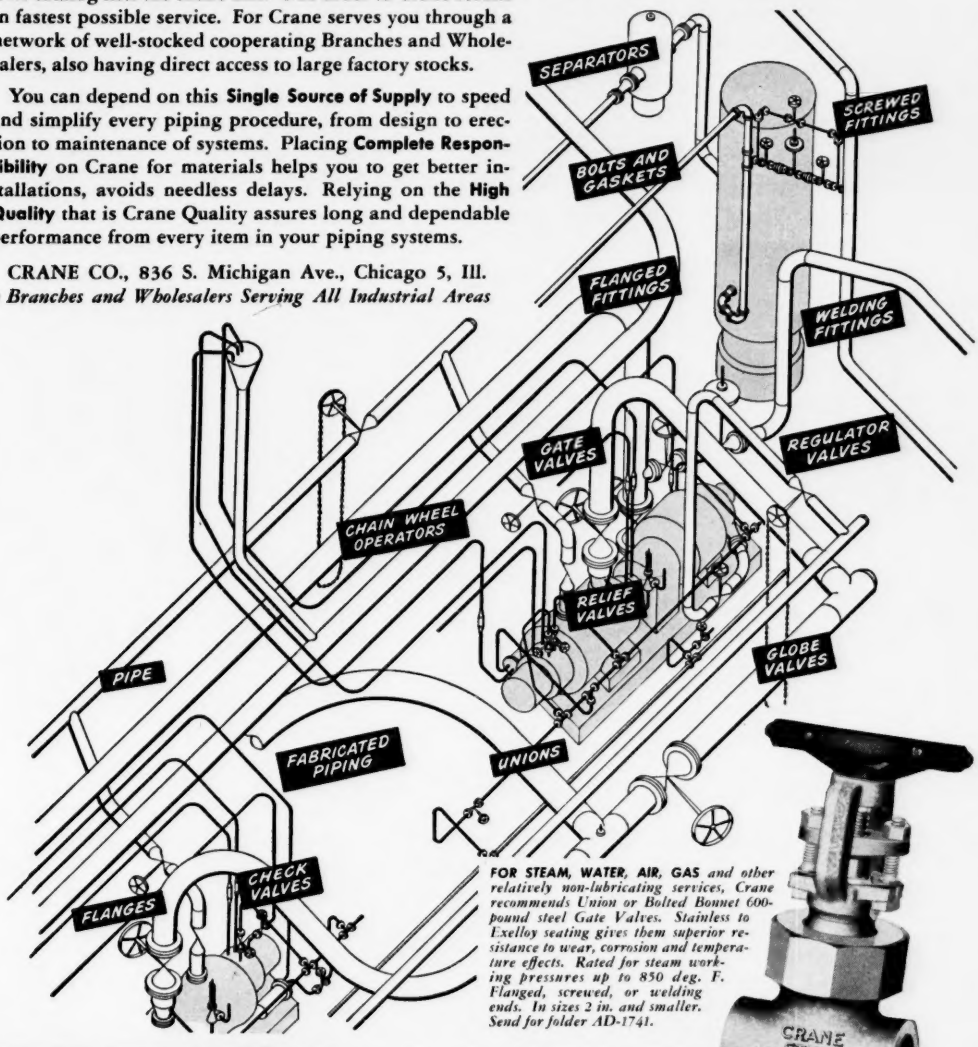

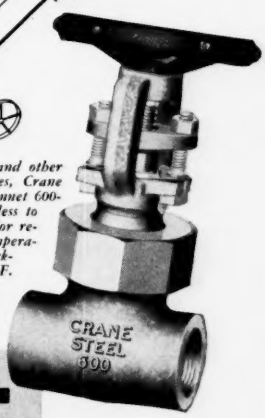

FOR STEAM, WATER, AIR, GAS *and other relatively non-lubricating services, Crane recommends Union or Bolted Bonnet 600-pound steel Gate Valves. Stainless to Exelloy seating gives them superior resistance to wear, corrosion and temperature effects. Rated for steam working pressures up to 850 deg. F. Flanged, screwed, or welding ends. In sizes 2 in. and smaller. Send for folder AD-1741.*

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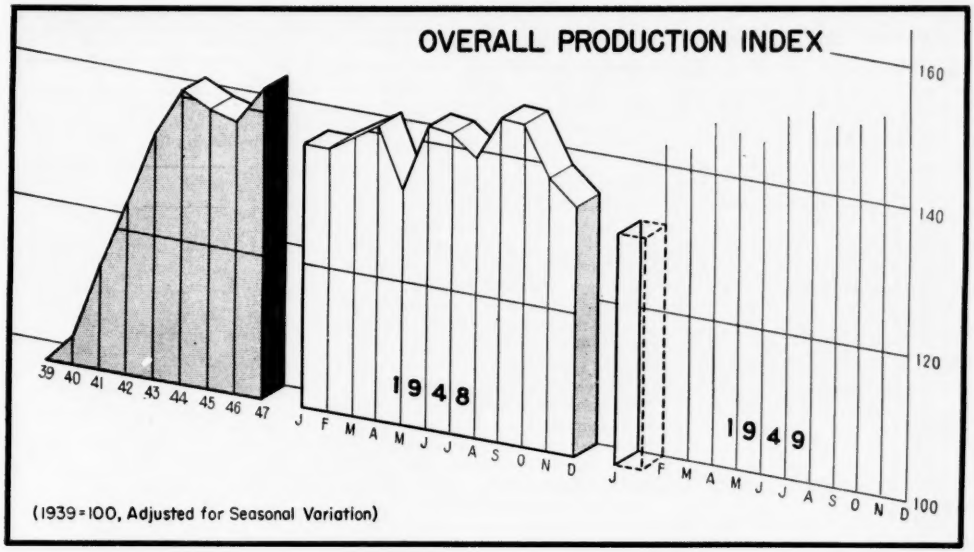
*Zenith Brand Olives and Cherries are packed by John Magee & Co., Inc., Saybrook, Conn.

Inviting, too, are the smartly designed Crown Screw Caps. They have eye appeal and buy appeal. With their Deep Hook Threads, they spin on easier and securely seal-in the flavor and goodness of these products. The cap liners are equally important. Crown's process, research and analytical laboratories have a lot of experience when it comes to liners. They are at your service in selecting the right type. Crown Cork & Seal Company, Baltimore 3, Maryland.
World's Largest Makers of Metal Closures.

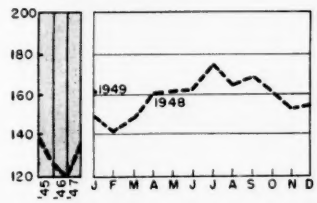
CROWN CLOSURES

Approved by Millions of Housewives

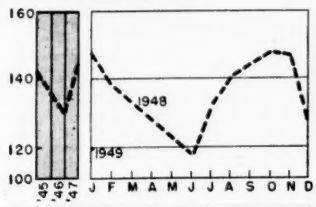
Food Industries Index


OVERALL PRODUCTION INDEX
160
140
120
100
39 40 41 42 43 44 45 46 47
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Beverages Climb a Bit



Confections Going Down



At a Glance—

(1939 = 100. With All Figures Adjusted for Seasonal Variations)

	Jan. 1949	Dec. 1948	Percent Change	Year Ago
Baking	131	138	−5	130
Beverages	162	154	+5	148
Butter	75	64	+17	68
Canning	133	136	−2	148
Cereals	136	135	+1	139
Condensed Milk	172	172	..	165
Confectionery	120	128	−7	146
Flour	129	130	−1	125
Ice Cream	164	162	+1	173
Malt Liquors	144	149	−3	156
Margarine	284	250	+14	306
Meat Packing	136	143	−5	135
Sugar, Beet	59	50	+18	112
Sugar, Cane	71	68	+4	74

Overall Food Output Shows No Change Though Pick-up is Anticipated

NOTE: In order to accommodate the shifting curves, the scales on the following commodity charts have been altered: Baking, Beet Sugar, Cane Sugar, Cereals, Confections, Flour, Ice Cream, Margarine, and Meat.—The Editors

DURING February, the index held steady, according to preliminary figures. It was indicated that processed food production was at the 132 mark for that month, the same as the revised figure for January.

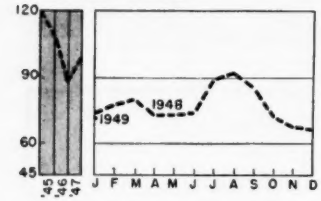
Two sections of the food industry which have found it hardest to raise production are the beverage and confection makers. The beverage output has only recently risen well above the previous year's figures, and confectionery has shown a considerable decline.

These processors have been plagued with high raw material costs, although sales prices of many of their products are very hard to raise. The nickel soft drink and the nickel candy bar are an American habit. Increases in their prices have run into heavy consumer resistance. On the other hand, lowering of the prices and increasing of the unit volume have been made difficult by sugar and cocoa shortages and costs.

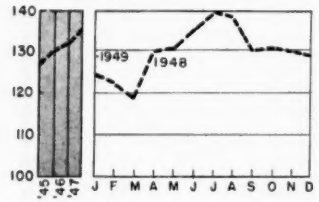
The wartime sugar shortage ended, of course, with resumption of imports from Cuba and other offshore producers. The improved flow of this raw material has permitted beverage and confectionery production to average higher than in the war years. However, the persistent shortage of cocoa has hampered the candy makers, forcing many to reduce the size of their bars or charge more for them. As for sugar, the 1941 price was 5¢ per pound. Now it is about 8¢. That makes it hard to offer a candy bar or soft drink for a nickel, although this low price was the basis of prewar volume selling.

Two factors could operate to increase sales volume in these industries. One would be gradual public acceptance of a somewhat higher than traditional price for drinks and candy. The other would be a drop in raw material costs. Cocoa prices recently took a sharp drop for the first time since the war. But the improving of cocoa supplies will be a long process because of tree diseases in the producing areas. Sugar prices were recently raised, following the small beet sugar harvest, and quotas restricting imports may hold the domestic price at this level well into 1949.

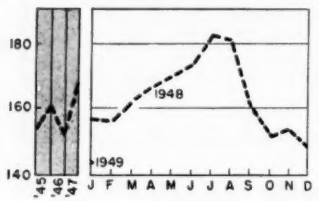
Cane Sugar Climbing



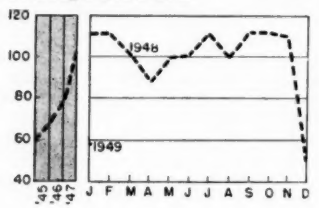
Flour Holds Its Own



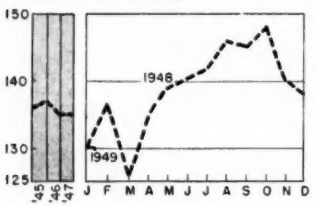
Malt Drinks Dropping



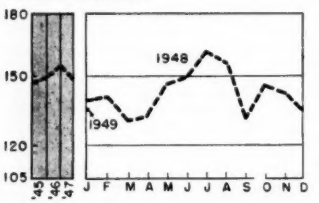
Beet Sugar Starts Back



Baking Drops Steadily



Cereals Stay Level



Total food output is expected to pick up beginning in April, when livestock slaughter will be increased by marketing of hogs from last fall's pig crop. Since this crop was larger than a year earlier, slaughter this spring should exceed the 1948 figure. Despite the decline in cattle numbers, the heavier hog slaughter should bring meat output above last season. Dairy production is also rising. A higher rate of milk production per cow should more than offset further declines in cow numbers.

Stocks Are Low

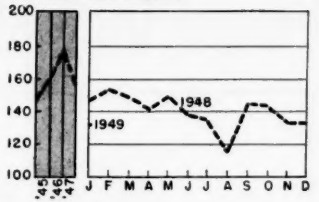
In the food industries, as in many others, inventory commitments were held down in the early months of 1949. The relatively small size of stocks on hand improves the outlook for production during the second quarter. Cold storage holdings of both beef and pork have been smaller than last year. There is more cream and more cheese in storage than a year ago, but less butter. Packers' stocks of some canned fruits and vegetables are high, but wholesalers and chain store warehouses have much smaller inventories of canned goods. Most distributors are apparently in a position to handle more food, if retail consumption increases.

Whether or not per capita consumption will rise depends largely on the trend of employment and wages. Families of industrial workers account for a major share of food consumption, but their expenditures have always been sensitive to any decline in workers' earnings. During January and February, industrial employment declined, with substantial layoffs by the railroads, building trades and some metalworking lines. This apparently resulted in lower consumption, particularly of meat, and forced stores to cut their prices.

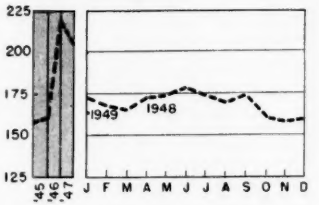
It is not yet clear whether the downtrend in employment will extend into the spring months. The odds are against such a trend. Construction normally picks up at this time of year. And there is usually a revival of orders for automobiles and all types of soft goods for retail trade. Lower retail prices for many items should stimulate activity in the consumer goods industries. And the important capital goods lines still are busy with heavy orders for new plant and equipment. Barring protracted strikes, such as might occur in the coal mines, total employment is expected to increase.

Moreover, there is still a strong prospect for wage increases in many fields of manufacturing. Steel and auto workers, for example, are still expecting a cash-pay boost. If a general rise in employment and earnings does develop, then food prices may stay close to present levels, despite the spring increase in production.

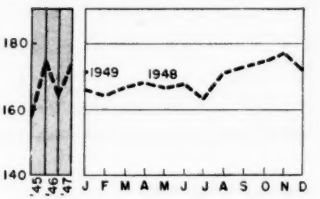
Canning Falls Slightly



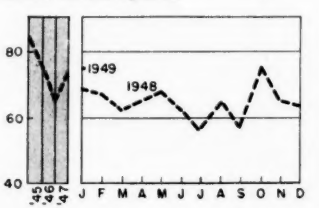
Ice Cream Moving Up



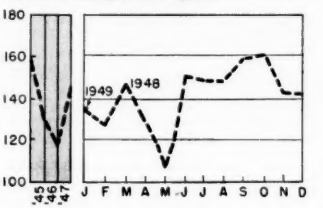
Condensed Milk Stays Put



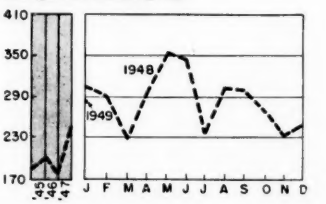
Butter Moves Upward



Meat Packing Falls Again



Margarine Pushing Up



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Beech-Nut Coffee
Beech-Nut Coffee
Beech-Nut Coffee

New Packages and Products

Salt-Free Bread For Special Diets

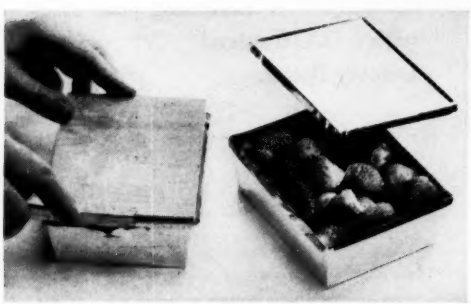
Offered particularly for use in diets where sodium chloride is not permitted, Sodex, a salt-free bread, is announced by the Davis Baking Co., Cleveland Heights, Ohio.

The product was first prepared on a small scale to accommodate local customers asking for the special baking. However, as demand grew, the firm decided to increase production of the special bread and to pack it in cans. Thus, freshness was protected and the bread became available to a larger market.

The can has a net weight of 10 oz. Chemical analysis, listed on label, shows each gram of bread has approximately .092 grams protein, .0106 grams fat, .53 grams carbohydrate, and .000078-.00036 grams of sodium.

Distribution is presently being handled through drugstores in Ohio, Pennsylvania, and Indiana.

Other health foods prepared at the bakery include: Salt-free sponge cake, rye bread containing no wheat, and diabetic bread made of pure whole wheat flour without added sugar.



Versatile Container for Cooked or Frozen Foods

An all-purpose aluminum container, Traypak, has been introduced recently by Reynolds Metals Co., Richmond, Va. In this one receptacle, it is possible to cook, freeze, store, and reheat foods.

The package is made from a single sheet of metal, has no seams, and cannot leak. It comes in quart and pint sizes. A separate lid, supplied to fit both sizes, is applied tightly by means of a simple manual closing tool (as shown in photo).

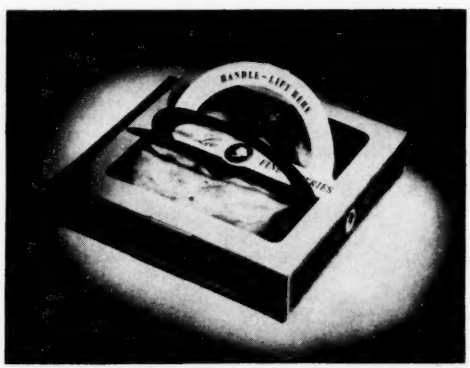
The trays are tapered to nest for shipment and storage, and the recessed lids enable convenient, firm stacking after filling.

In addition to many uses in locker plants and for home freezing, the trays also find application in the baking of cakes, packaging deep-dish pies, fudge and other candies. Bakeries have reported excellent results with easy control, since the aluminum cools quickly upon removal from the oven and does not continue to cook the product.

New Label for Table Sirup

Another label has been added to the "Sweetose" line of sirups by A. E. Staley Mfg. Co., Decatur, Ill. It is for sorghum-flavored sirup and is in addition to Crystal (white), Golden, and Waffle types.

Lithographed square cans are now being used to package "Sweetose" for the western regions of the U.S., where they have long been popular with ranchers and prospectors who find the package easily carried by saddle pack. The square cans come in three sizes: 2½, 5 and 10 lb.



Easily Carried Food Container

Unique packages with a built-in handle have been developed by E. J. Schoettle Co., Philadelphia. Called Sure Handle Boxes, they are made of sturdy cardboard. Features can be varied according to the type of contents.

The new containers have been tested successfully in merchandising pies (see photo) in a large eastern chain of self-service grocery stores. Any item that requires protection from crushing, convenience in handling, and visible inspection can be advantageously offered in these cartons.

Reaching the store with the handles fastened down, the boxes can be stacked neatly on the counter or shelf. Then, with the handles raised invitingly, the contents become fully visible through the cellophane window, affording eye appeal for impulse buying.

(Packages and Products Cont'd)

WHICH CAP WOULD SPOTLIGHT THE PRODUCT?

BEFORE

AFTER

Good, colorful cap design makes the product stand out on the store shelf like a shining beacon . . . stops shoppers, promotes sales. This "before and after" illustration is a typical example of how Armstrong's expert package designers can take a plain, uninteresting cap and, by adding an interesting design in color, make the cap an effective sales tool. An attractive sales message can be added in color for a fraction of a cent per cap. Let our designers show you how your metal caps would look with a crisp, sparkling sales message lithographed on it. For design suggestions, send sample package and market information to Armstrong Cork Co., Glass and Closure Division, 4204 Prince Street, Lancaster, Pennsylvania.

Armstrong's Closures

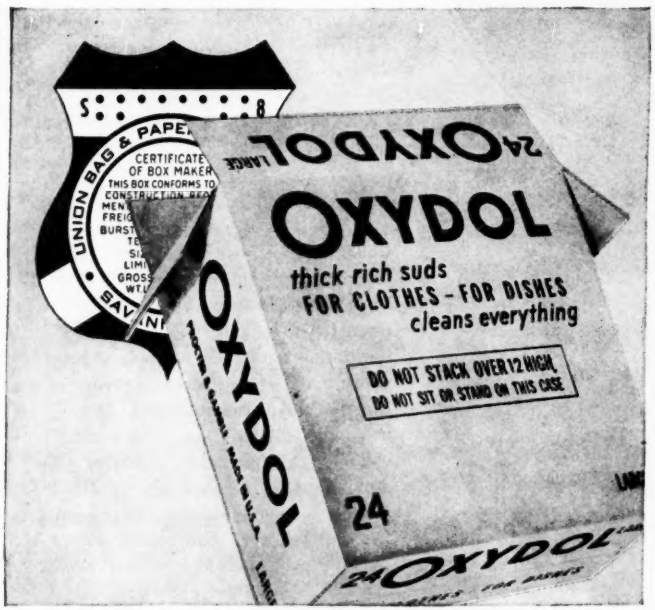
TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12

THE KEESHOND comes to us from the Arctic, via Holland where he is very popular. A close relation of the Chow and the Eskimo Dog, many consider him more beautiful than either, with his heavy coat of silvery gray with black tips.

Experienced Buyers look at the Pedigree—

Buyers of Boxes, too!



A BOX with a pedigree has outstanding reputation and resources behind it. That's why—

Procter & Gamble, makers of the famous Oxydol soap powder, trust their products to Union corrugated 100% Kraft boxes.

Experience of 75 years undisputed leadership in paper packaging goes into Union boxes. Every step in making, from tree to finished box, is quality-controlled by one management in America's largest integrated pulp-to-container plant.

Vast forest resources, four modern box plants, and five of the nine largest paper machines in the world are your guarantee of consistent quality, consistent service and fair price, today and in the future.

That's the pedigree of Union boxes. That's why, every month, more makers of famous brand products are using them.

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

New Hydrogenated Shortening

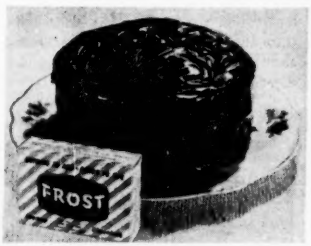
Propyl gallate-citric acid antioxidant and a glyceride emulsifying agent are added to the hydrogenated blend of soft meat fats and stable vegetable oils in Bake-Rite shortening produced by Wilson & Co., Chicago.

Termed an improved type of product with greater digestibility, blandness and creaming properties, the new item is described as the latest development in high quality, all purpose hydrogenated shortenings.

The mixture is offered in 1 and 3 lb. metal tins lithographed in greenish blue with white and red lettering. Can was designed by the manufacturer's artists in cooperation with Continental Can Co., supplier of the package.

tions say simply to allow the package to stand at room temperature until it becomes pliable, then whip the contents to a creamy texture. One package provides enough icing for a medium sized cake.

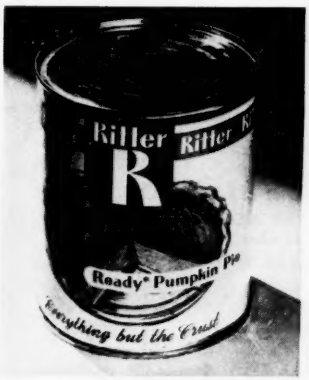
Composed of confectioner's sugar, vegetable shortening, cocoa, edible oil, vanilla concentrate, butter and salt, the mixture requires no refrigeration. It is reported to keep safely on the pantry shelf without turning rancid, retaining its smooth consisteney indefinitely.



Cake Icing Made Easy

One of the newest aids for convenient household baking is Frost, a prepared chocolate fudge frosting that does not require the addition of any other ingredient — not even milk or water.

Manufactured by Frost of Milwaukee, the new product comes in a cellophane bag (net wt. 4-oz.) contained in a gaily striped cardboard box. Direc-



Pumpkin Pie Filling in Cans

Prepared pumpkin pie filling is currently being packed in cans by the P. J. Ritter Co., Bridgeton, N. J. The ready-to-use filling does not need to be mixed, stirred or beaten. Nothing need be added to it before emptying from the can into a crust.

Contents of a single can will fill a 9-in. pie plate. Ingredients include

(Packages and Products Cont'd)

Cans of Distinction

HERE ARE CUSTOMER CATCHING CANS

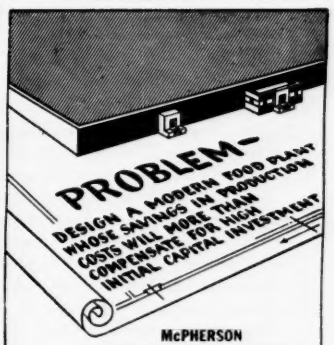
We offer a complete custom service from sketch to a finished product that is exclusively yours. We also manufacture a complete line of round cans with stock designs for candies and cookies.

Let Empire quote on your requirements. We should get acquainted.

"No other container protects like the can"

Empire Can Corp.

228 Ashford St. Brooklyn 7, N. Y.
APplegate 7-4701


PROBLEM—
DESIGN A MODERN FOOD PLANT WHOSE SAVINGS IN PRODUCTION COSTS WILL MORE THAN COMPENSATE FOR HIGH INITIAL CAPITAL INVESTMENT

McPHERSON
ADVANCED ENGINEERING
SOLVES THIS PROBLEM

COMPLETE PLANT DESIGNS

Plant Site Investigations
Labor Saving Studies
Process Analysis
Appraisals
Plans
Research and Reports
Industrial Surveys
Valuation

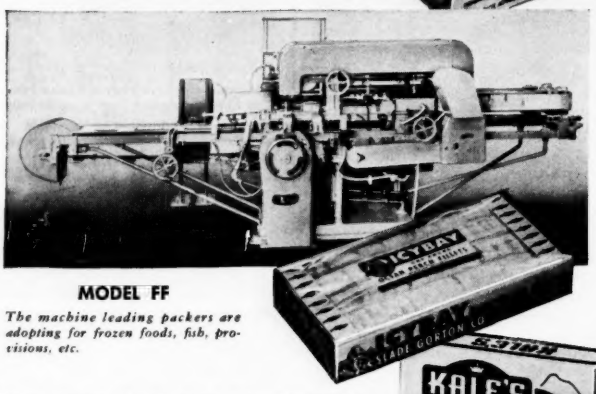
Write for an analysis of your particular problem. No obligation.

The McPherson Co. Greenville, S. C.
Engineers · Architects

pumpkin, sugar, starch, whole milk, whole eggs, salt and spices. It is recommended that the pie be baked first in a hot oven for 10 min., then in a moderate oven for 50 min. before cooling and serving.

Wrap 'em faster
Wrap 'em better

for Lower Costs... Greater Sales



MODEL FF

The machine leading packers are adopting for frozen foods, fish, provisions, etc.

Orders for our Model FF are mounting steadily. Packers from coast to coast are losing no time in taking advantage of the savings this machine makes possible in their wrapping operations.

The Model FF wraps frozen foods, provisions, fish, etc., in cartons, metal-end fibre cans or trays at speeds of well over 100 packages per minute. Handsome, perfectly sealed wraps of printed material that enable you to show your product in all its appetizing goodness!

The products may be wrapped before or after freezing, for the FF will allow variations of up to ⅜" in width of package.

Easily cleaned and lubricated. Only rust-proof parts come in contact with the package. No spilled product can enter machine. New type overhead transport chain makes machine self-clearing, prevents jams. Quickly adjustable for various sizes.

See us at the PACKAGING SHOW
Atlantic City Auditorium
May 10-13 · Booth 316

Yes, the FF has everything to insure trouble-free, low cost operation. So get in touch with our nearest office for complete information.

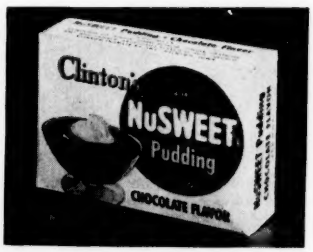
PACKAGE MACHINERY COMPANY
SPRINGFIELD 7, MASSACHUSETTS
NEW YORK CHICAGO BOSTON CLEVELAND
ATLANTA DENVER LOS ANGELES SAN FRANCISCO
SEATTLE TORONTO MEXICO D.F.

New Frozen Fish Packages

Introduction of a new customer-size 1 lb. frozen fish carton and a redesigned 5 lb. container is announced by the Birds Eye-Snider Division of General Foods Corp.

In answer to many housewives' requests for uniform weight to help in recipe planning, the company now has in national distribution ocean perch and cod in the new sizes. Soon to follow will be flounder, haddock and mackerel.

The new packages follow the picture design already established for the firm's other products. A full color photograph shows how the food will look when prepared. Skilfully woven into the carton design is a seascape showing three of the large modern diesel trawlers.



Pudding Line Introduced

Chocolate, vanilla, butterscotch, and lemon-flavored puddings are being introduced in a complete new line under

the NuSWEET label by Clinton Industries, Inc., Clinton, Iowa.

Striking, full-color packages designed for the puddings feature a red bull's eye bearing the brand name, alongside a realistic reproduction of the prepared product.

Continental Confections

Marzipan, Helga-rettes, nougats, cake bits, and other European type candies, are now being introduced to the Southern California markets. The products are made by a new company, Helga Continental Confections, which was recently established in Los Angeles by Peter O. Garner.

The candy is sold in pound and half-pound boxes, colored pink and blue. The marzipan is a chocolate coated blend of soft almonds with pineapple and pistachios. Small squares of cake with a dark chocolate cover make up the cake bits. Helga-rettes are composed of filberts in a creamy, coffee-flavored base, also cloaked in chocolate.

Sausage in Cellophane Bag

Distinctive identity has now been given Magnolia Brand Pure Pork Sausage. The maker, Emmart Packing Co., Louisville, Ky., has adopted a wrapper comprising a double-walled cellophane bag printed in bright red against a yellow background. At the same time, flavor and appearance are protected. Bags are supplied by Shellmar Products Corp., Mount Vernon, Ohio.

Strained Sweet Potatoes

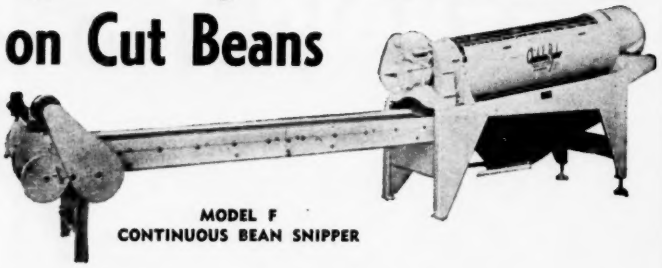
New for the baby's menu are strained sweet potatoes, produced by Gerber Products Co. This product is offered in standard 4½ oz. containers.

Developed from one of the richest sources of vitamin A and credited as a major advance in food processing, the new item presented a series of production problems that required

(Packages and Products Cont'd)

NO OTHER STRAINER
YARWAY
IRON
OFFERS ALL THESE ADVANTAGES
A good strainer protects your equipment and pipelines. Yarway gives you a better strainer to "police your pipelines".
• FIRST—*The Screen* is a high-grade woven monel wire basket that catches solids, lets condensate, oil or other fluids flow freely. Perforated screens if desired.
• SECOND—*Screen cap* is made with straight thread, machined face and spark-plug-type gasket, insuring tight joint. Screen comes out with cap for easy cleaning . . . automatically aligns when replaced.
• THIRD—*Iron and steel bodies* are *cadmium-plated* for protection against corrosion and for better appearance.
• FOURTH—Available in six sizes, from ½" to 2" for pressures to 600 lbs.
• FIFTH—Reasonably priced.
• SIXTH—Stocked and sold by 150 Mill Supply Houses. Hundreds of thousands already in use. See your local dealer or write for Bulletin S-201.
YARNALL-WARING COMPANY
127 MERMAID AVENUE PHILADELPHIA 18, PA.
YARWAY STRAINERS
"Police the Pipelines"

Quality Production on Cut Beans



MODEL F
CONTINUOUS BEAN SNIPPER

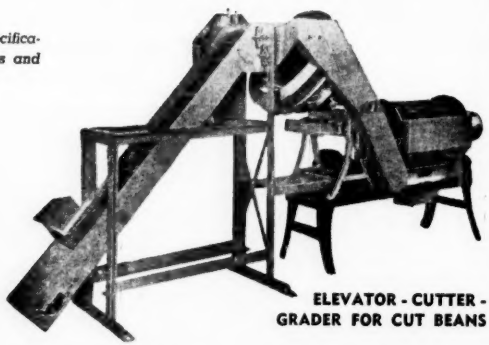
CRCO Bean Equipment Insures a Greater Percentage of Quality Product —Plus Uniformity and Good Appearance So Essential for Glass Pack or Freezing.

CRCO Continuous Flow Bean Snippers and Cutter-Grader Units deliver that constant uniformity of size and clean-cut appearance that identifies a quality pack of cut stringless beans. This insures a greater percentage of premium pack and consequent higher profits for the processor.

CRCO Model F Bean Snipper produces a clean draw-cut on each end of the bean without pinching, crushing or unnecessary bleeding. No ragged edges or "whiskers" to mar the appearance of the product in glass or when frozen.

CRCO Cutter-Grader Units automatically cross-cut stringless beans into any length from half-inch and up—then grade them according to diameter.

Send for complete specifications of Bean Snippers and Cutter-Graders



ELEVATOR - CUTTER - GRADER FOR CUT BEANS

THE BEST OF Everything

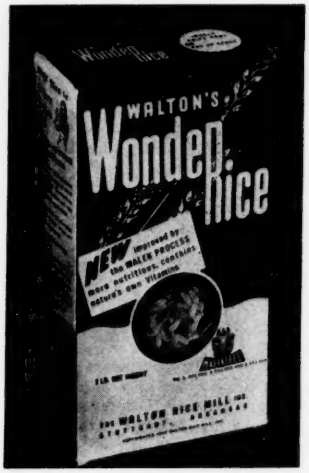
CHISHOLM-RYDER CO. INC.
Niagara Falls, New York
FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania
AN AFFILIATE

Ayars Machine Company
A SUBSIDIARY

250

full year of intensive study. One of the chief difficulties was prevention of discoloration.



"Malekized" Rice

Produced by a new technic called the Malek process, WondeRice has been recently introduced in 1 lb. packages by the Walton Rice Mill, Inc., Stuttgart, Ark.

The process, developed commercially by the General American Transportation Corp., is a method of par-boiling and steaming the unpolished rice so that almost all of the nutritional value in the bran is said to be forced into the core of the grain. At the same time, the pores of the rice kernel are, it is reported, sealed through gelatinization to lock in the valuable minerals and vitamins.

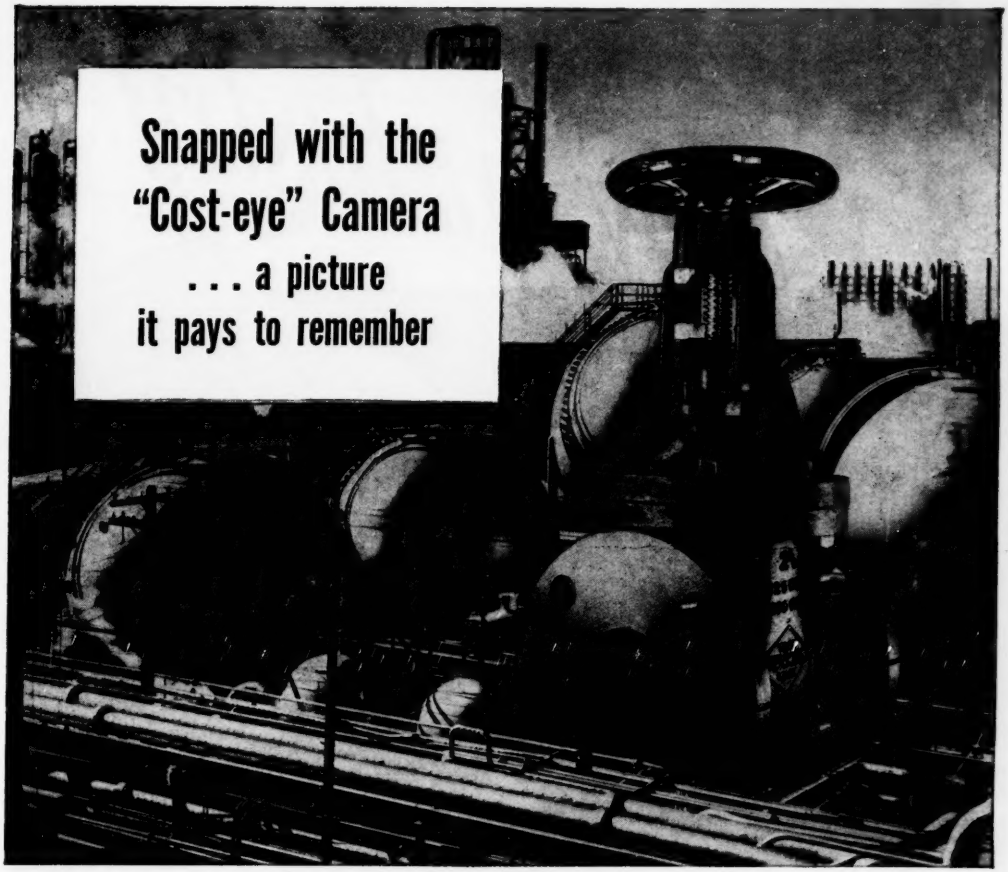
The product is now being introduced through grocery outlets in selected markets of the U. S. The carton is in brown and yellow colors. It has a plastic window in the front and a pouring spout on top.

Jumbo Hazelnut Bars

New candy bars made from cocoa beans, pure milk solids and oil-roasted hazelnuts have joined the confectionery products offered by Walter Baker Chocolate & Cocoa Division of GFC.

Molded at a net weight of 4½ oz., the bars are wrapped with an inner layer of glassine and an over-all outer wrap of foil laminated to paper. The label design is printed in four colors —cream, burgundy, and blue on a background of transparent gold.

—*End*



IF A CAMERA could be constructed with an eye to costs, this is the picture you'd get of a synthetic rubber plant. By showing *all valves* as *one valve* it brings into proper perspective the valve investment in *any* plant, *any* large building where operation involves fluid control. Collectively, valves represent a major expenditure . . . yet too often, they are selected with "petty cash" consideration.

IT WILL PAY MANAGEMENT to keep this picture in mind. With wages and material costs the highest ever, valve maintenance costs must be watched as carefully as operating expense of larger plant units.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets.

JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, inspection or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. *Sold through leading Industrial Distributors everywhere.*

•

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco.
Jenkins Bros., Ltd., Montreal.

"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write: JENKINS BROS., 80 White St., New York 13, N. Y.

LOOK FOR THIS JENKINS DIAMOND MARK
SINCE 1864

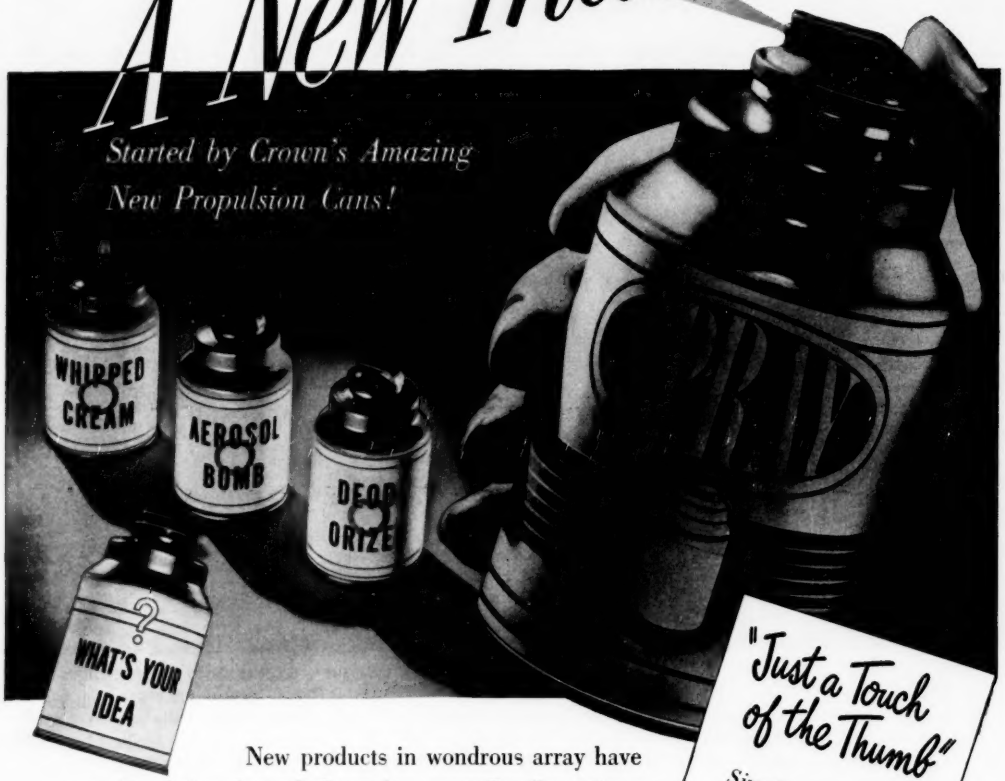
JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

FUTURE OF INDUSTRY
depends on New Inventions.
Crown Can Scientists are looking
to Crown's Future—and yours!

A New Industry

Started by Crown's Amazing
New Propulsion Cans!



New products in wondrous array have come into being through Crown's newest Can Invention — the one-piece cone-topped Crown Propulsion Can. Under gas pressure comes out Whipped Cream, Insecticides, Sprays, Kitchen Deodorants, and only Inventive genius knows "what next?"

Remember the no-side-seam, no-top-seam molded cone top Crown Can is different and ideal for pressure use. Perhaps this Can is a "natural" for your product—perhaps you have a new idea. Ask to have a Crown Sales Representative call and discuss it.

"Just a Touch of the Thumb"

Simply press top of Crown Can and spray contents direct from the Can. Think what possibilities this offers.

CROWN CAN

One of America's Largest Can Manufacturers

PLANTS AT PHILADELPHIA, BALTIMORE, CHICAGO, ST. LOUIS, HOUSTON, ORLANDO • ***Division of the Crown Cork & Seal Company***

Food Industry News

Hoover Report on USDA Reorganization Being Studied by Food Producers

Food processors have shown a keen interest in the recent Hoover Commission report suggesting a reorganization of the Department of Agriculture. Among its recommendations the report suggests:

1. The Department should have all the regulatory activities of the Federal government having to do with food. This recommendation includes taking the Food & Drug Administration from the Federal Security Agency and putting it in Agriculture.

2. All research activities of the Department should be put under one head in a so-called "Research Service." This agency would include the present technical research bureaus of the Agricultural Research Administration, research activities now done by Production & Marketing Administration and other agencies of the department, and the research now conducted under the Research & Marketing Act, which would be abolished as a separate entity.

The Hoover Commission had these two major recommendations:

1. A reorganization along more sensible lines of the Department's many bureaus, administrations, and services in Washington. 2. Elimination of the confusion, overlapping, and duplication at the grower's level brought about by the several field agents in each county, each representing a different home office in the Department.

The report led off with the note that the Department in the last 20 years had grown from an agency of 22,000 employees with a budget of $25,000,000, to 82,000 employees with a budget of $834,000,000.

Out of Proportion

In stressing the need for straightening out Agriculture's field services, the Commission reported that "47 employees attached to seven distinct and separate field services of the Department of Agriculture, in one cotton producing county in Georgia, were working with 1,500 farmers, and a fruit and grazing county in the state of Washington has 184 employees of separate field services working with some 6,700 farmers." Other similar instances were noted.

In general, Hoover's ideas meet with approval of the present top officials of the Department. But putting these recommendations into effect is something else.

Secretary of Agriculture Brannan has indicated, however, that he will put into effect those recommendations with which he agrees and which he has the authority to make. He will also ask Congress to give him the authority to make other changes with which he agrees. Those recommendations with which he does not agree, the secretary will report to Congress.

President Truman is believed to be genuinely interested in reorganizing the government along more efficient lines. He has praised Hoover highly, and most Washington observors believe he will attempt a general reorganization.

There is a strong drive underway, however, to write into the authorization bill exemptions which would protect certain agencies by requiring the President to submit any reorganization plan for them separately. The bill which passed the House had seven such exemptions.

Another case in point—and one of importance to food processors—is the Hoover recommendation transferring Food & Drug to Agriculture.

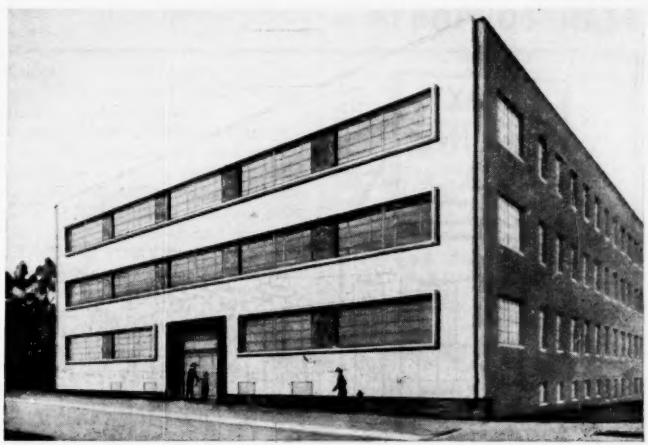
Here are some of the activities which would be administered by the new agency: Voluntary grading of fruits, vegetables, and meat; inspection of meat, animal virus serums, toxins, insecticides, and seeds; standardization of containers; Federal Trade Commission's activity against false advertising claims made for foods; Treasury Department's administration of the taxes against oleomargarine; and Food & Drug's authority over food standards and adulteration.

The Transfer of Food & Drug to Agriculture is being bucked by those who think that the law should be administered by an agency most likely to represent the best interests of the consumer. Under the Department of Agriculture it is contended, these regulations would be apt to reflect only the interests of the farmer.

Food Men in CED

H. J. Heinz II, president, H. J. Heinz Co., and George L. Morrison, chairman of the board, General Baking Co., are among the seven new trustees elected by the Committee for Economic Development, according to Chairman W. Walter Williams. The same announcement also revealed that Clarence Francis, chairman of the board, General Foods, will head CED's nominating committee.

(Industry News Continued)



National Canners Start Building

Construction of the new National Canners Association administrative and laboratory buildings in Washington and Berkeley, Calif., are scheduled to start this spring. The drive for 1,500,000 to defray costs is entering final stages, under direction of Fred C. Heinz, assistant to president, H. J. Heinz Co. This is artist's rendition of the laboratory and administrative building to be erected in Washington.

Congress Girds for Fight Over Farm Supports

The farm bloc in Congress is in for a rip-roaring family fight. Between now and July, some of the hottest debates and the most flowing oratory in the House and Senate will be over this question—

What kind of government price supports will be given farm crops—and how high should these price supports be?

The outcome of this battle is important to food processors because (1) it will influence the price paid for grains, flour, rice, peanuts, and vegetable oils; and (2) the end result could possibly bring under price supports farm crops like fruits and vegetables, meat, and dairy products.

Reason for the on-coming storm of argument is simple. Except for meat, the price of most farm products is at parity or below. This year, the government is committed to support many of these crops at 90 percent of parity.

Up to January 1, 1948, the government had support programs operating for 25 farm commodities. Later figures revealed that farmers have 4,000,000 bales of cotton and 343,000,000 bushels of wheat under government loan or purchase agreements. Total U. S. commitment on these two crops alone is $1,340,000,000.

The sign is clear: Unless something is done to dispose of them, farm surpluses far greater than those of the '30's are on the way.

There is no doubt that Secretary of Agriculture Brannan is getting ready to use acreage allotments and marketing quotas next year. While Brannan had not made known the Administration's stand on all this as FI went to press, the acreage allotment provisions of the Aiken law may give Brannan the compromise he is looking for, in the face of growing farmer pressures for government guarantees of good prices.

When farmers vote for acreage allotments under the Aiken Law, they automatically get an increase of 20 percent in the support price for their crop. If wheat were in such surplus that it would rate only the lowest Aiken Law support (60 percent), farmers could get 72 percent of parity by approving acreage allotments. If the supply-demand on wheat is about average, or at the 75 percent support level, a vote for allotments would bring the support level up to 90 percent.

Cost Reduction Program Progresses at Hunt's

Hunt Foods' program for holding down prices, through complete overhaul of its equipment and operational procedure, got into high gear in 1948.

One of the major expenditures was at the company's Hayward, Calif., plant. The entire fruit canning department was rearranged and streamlined. The company also has been active, according to a recent report, in developing new machinery and equipment for use in all its other food canning operations. Construction of a huge new warehouse—274,000 sq. ft. in area—was also completed during the year. In addition, improvements and important changes in machinery and equipment were made at other plants, reducing costs considerably.

Other measures responsible for lowered costs included consolidation of the dried food plant at San Jose with the fruit canning plant at nearby Campbell. The San Jose property was later sold. Acquisition of the facilities of E. Pritchard, Inc., at Bridgeton and Winslow, N. J., also gives the company an eastern base for the processing of vegetable and tomato products, thus cutting former costs of distribution to this area.

Fellers Elected To Head ACS Food Division

Prof. Carl R. Fellers, head of the department of food technology, University of Massachusetts, Amherst, has been elected chairman of the American Chemical Society's Division of Agricultural & Food Chemistry. He succeeds Dr. Paul M. Logue, director of development of the Phosphate Division of the Monsanto Chemical Co., St. Louis.

Dr. L. E. Clifcorn of the Continental Can Co., Chicago, was chosen as vice-chairman, and Dr. Arthur N. Prater of Gentry, Inc., Los Angeles, as secretary-treasurer. Dr. Logue was named to the Division's executive committee, as were Dr. John S. Andrews of General Mills, Inc., Minneapolis; Dr. R. R. Legault of the Western Regional Research Laboratory, Albany, Calif.; and Dr. W. J. Peterson of North Carolina State College.

Food Company Earnings

Earnings were up for American Molasses Co. and Canada Dry Ginger Ale, Inc., while Hunt Foods, Inc., and Rockwood & Co., showed profit declines, in recent reports covering varying periods.

American Molasses revealed a consolidated net income of $116,799 for the six months ending December 31. This compares with $110,169 for the same 1947 period. Canada Dry's net for the last three months of 1948—the first quarter of its fiscal year—was $856,404, compared with $852,252 for the corresponding period in 1947. Net sales for the quarter were $13,582,965, compared with $12,939,076 the year previous.

For the fiscal year ended November 30, Hunt Foods showed a severe drop in net income—to $339,031, compared with its $2,714,779 for fiscal 1947. The 1948 net, moreover, includes $182,000 of special income. Consolidated net sales for the year amounted to $34,886,723, compared with $46,276,702 in '47. (See item center column.)

Rockwood & Co., chocolate and cocoa manufacturers, reported net earnings of $929,770 for the year ending De-

Brewing Chemists Meet

Executive Committee of the American Society of Brewing Chemists pause to be photographed as they discuss society's annual meeting to be held this month in New Orleans. From left: F. E. Connery, secretary; Stephen Laufer, 2nd vice-president; C. A. Dayharsh, 1st vice-president; P. P. Gay, president; W. G. Artis, treasurer; and Christian Rask, past president. The meeting will be at the Roosevelt Hotel.

cember 31. In 1947, net income was $1,224,810 after deducting $100,000 for a reserve. Working capital was increased, however, from $4,939,710 at the end of 1947 to $5,132,207 at the end of 1948, despite expenditures of $535,000 for plant improvements and equipment. At the close of the year, the company had no indebtedness to banks whereas at the end of 1947 bank indebtedness amounted to $1,100,000.

PROCESSING

Ingredient Suppliers Fight Over Bread Standards

Bakers, flour millers, fats and oils producers, and other food processors, have been eyeing a hot industry slugging match that has developed in Washington over Food & Drug standards for bread. The flight flared up against the background of falling prices for fats and oils—and it could have an important bearing on future demand for shortening.

The contenders were Atlas Powder Co., supported by several lard manufacturers, vs. Procter & Gamble, Swift & Co., The Institute of Shortening Manufacturers, and the vegetable oil industry.

The Food & Drug Administration, which is holding the hearings on standards of identity for bread, acted as referee.

The question was: Should Atlas' emulsifiers or bread softeners be listed as optional ingredients in a Food & Drug standard for bread?

What Atlas wants is to keep its toehold on a market that is as big as the market for bread. The shortening people, on the other hand, want emulsifiers kept out, because they fear the new ingredients will completely substitute for, or sharply cut down the amount of the shortening the baker uses per loaf.

The baker's stand is that they want the hearing to develop complete information on the emulsifiers so that Food & Drug will have all the facts on which to rule for or against them. If they serve a beneficial purpose, and are not toxic, the bakers feel they should be permitted in the standards.

The shortening manufacturers have been contending that Atlas' MYRJ 45 is a chemical substitute for shortening —and they do not want Food & Drug to allow its use in bread baking.

MYRJ is polyoxyethylene monostearate. It is made from a natural gas or petroleum base. There is no doubt that, on a cost basis, the emulsifiers can—and will—result in the use of less shortening in bread. Sales agents for the compounds have promoted and successfully sold the products on just that basis.

Atlas contends, though, that the products are an additional ingredient, and that if they add to the quality of bread, the bakers should be permitted to use them or not as they see fit. Atlas testimony cites the fact that about 6,000,000 lb. of MYRJ 45 has already been used in some 2,400,000,000 loaves of bread.

On the toxicity angle, Atlas has put on the stand Dr. Perry J. Culver, of Massachusetts General Hospital, Boston. He has been using the emulsifiers to increase fat absorption of patients whose systems, because of intestinal operations or other causes, do not take in enough fat. On the stand he testified he could see no ill effects from using emulsifiers in bread, even if the bread were eaten from infancy.

The consumer will benefit, according

(Industry News Continued)

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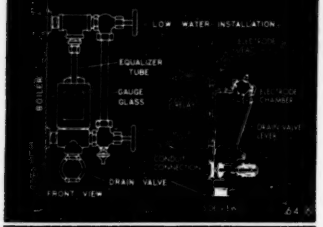

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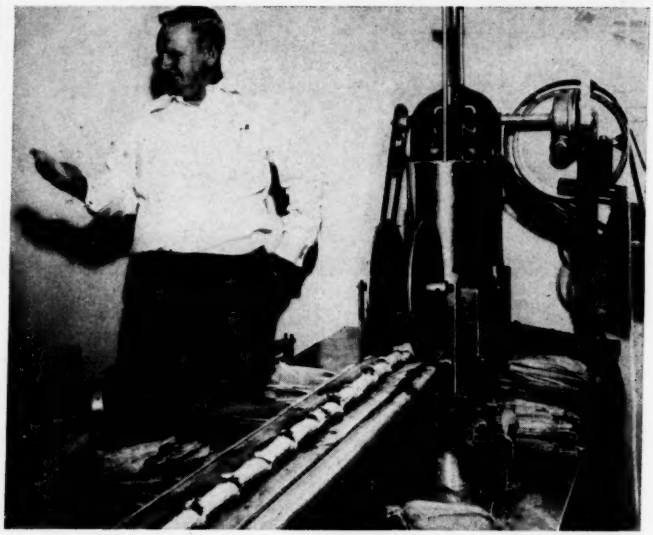

Frozen Hot Stuff

Six tamales and a half-pound of sauce go into each Pliofilm-wrapped quick-frozen package at the Swaney Mfg. Co. plant, in Phoenix, Ariz. The plant has a daily capacity of 12,000 tamales, 10,000 tortillas, 600 tacos, and 1,200 toasted tamales. President H. M. Swaney is pictured doing a little inspecting.

to Atlas, because its emulsifier prolongs the softness and palatability of bread. Use of MYRJ 45—while not preservative—means that bread stays fresher longer in the breadbox.

Behind the scenes, another fight is going on—a patent fight.

Procter & Gamble has a group of patents covering the use in baked goods of mono- and di-glycerides made from edible fats and oils. P&G has licensed many shortening manufacturers to add these products to make what is called "high ratio" shortening.

Use Limited

P&G's license agreement provides that the licensees use a percentage of mono- and di-glycerides that is no higher than that of P&G's own high-ratio product—which has been about 10 percent. Right now, P&G has a suit against Swift & Co. for using as much as 30 percent mono- and di-glycerides in one of its shortening products.

Whether or not the P&G patents also cover the use of Atlas' emulsifiers is something that may have to be settled in court. But P&G says they cover shortenings containing at least one class of the emulsifiers Atlas is trying to get into the bread standards.

At any rate, Atlas claims that it ran into P&G's patents when it looked into the possibility of selling its emulsifiers to shortening makers to add to their formulas either along with or in place of mono- and di-glycerides.

So what Atlas did, just after the war, was to go to the baker via the bakers' supply houses. Atlas distributors sold its emulsifiers separately—and suggested to the baker that he add them directly to his bread dough. And, says Atlas, sales began climbing swiftly, partly because of the short supply and high prices of shortenings at that time.

An odd twist to the story is that the emulsifiers were proposed as an optional ingredient during hearings Food & Drug held last year on mayonnaise. But then there was no rumpus, although presumably the emulsifiers would have a similar economic effect on the fats and oil makers.

Correction

In the article, "Develop New Test for Gaging Leakage from Frozen Fruits and Berries," February, 1949, FI, page 102, a footnote, indicating that the work reported was jointly sponsored by the Tennessee Valley Authority and the Georgia Tech Engineering Experiment Station was inadvertently omitted. Launching of this joint frozen foods research project was described in FOOD INDUSTRIES, June, 1948, page 98.

Develop New Hybrid Corn For Processors' Use

A new hybrid sweet corn that will be especially useful to canners and freezers has been developed at Iowa State College. It has been released to seed men for commercial seed production and will be available for the 1950 crop plantings.

The corn, named Iochief, has a cutting percentage of 42 percent, which is 5 or 6 percent better than hybrids currently grown for cannery use. It has exceptional moisture-retaining qualities, which give the cannery and the producer several days leeway during the harvesting period. Also, it is able to remain in the canning stage two or three days longer than other varieties.

In 1948, the corn yields amounted to 7 tons per acre—1 to 1½ tons more than existing varieties. This is the suckerless plant that has been in demand to facilitate better mechanical harvesting of sweet corn.

Cost Problems Weighed By Poultry Industry

Poultry raisers, and sellers and processors, analyzed their business methods during their three-day annual Fact Finding Conference in Kansas City, Mo., February 6-8, sponsored by the Institute of American Poultry Industries. Conference speakers stressed the acute need for accurate cost records, continuous cost analyses, streamlined procurement, and improved plant operation and merchandising.

R. A. Hudson, Igleheart Bros. Div. of General Foods Corp., Evansville, Ind., told members that dry mix manufacturers expect quality dried egg products in their stable and growing business. More dried egg yolks are used than any other egg product, principally for doughnuts and certain types of cakes, he said. In cake doughnuts, dried yolk rates on a par with fresh egg yolks, even though performance is not identical. However, dried egg yolk with improved "emulsifying properties" would probably lead to wider usage.

When the actual functions of egg yolks are better understood, processors will know how to improve the product. Dried whole eggs are used to some extent, but short storage life has some disadvantages, according to Hudson. The new developments, such as sugar dried eggs and dried mixture combinations, are being tried out at present.

The measure of a good egg for storage was outlined by Dr. Mary E. Pennington. The egg must be fresh,

(Industry News Continued)

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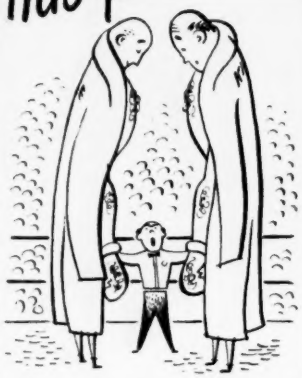

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clean, properly oiled and dry, and fillers and flats must be new. If clean eggs of top interior quality are properly packaged and refrigerated, loss from deterioration should be less than 1 percent at the end of 6 months.

Operating Costs

Station maintenance, labor, supplies, trucking and overhead were also discussed. Emil O. Johnson, North American Creameries, Minneapolis, presented figures taken from actual costs at a Minnesota plant which has been operating a quality-grading program for two years. Thirty-six percent of the eggs procured are picked up by truck routes, 27 percent come in through outlying stations, and 37 percent are door deliveries.

Lloyd Woodall, Armour and Company, explained a simplified method to be used to keep daily costs up to date. He said a plant manager must analyze every phase of his business to determine what costs should be for each operation. Although forms and accounting systems vary with different operations, Woodall illustrated a simplified method of figuring the costs of handling a 4½-lb. fowl, based on 30,000 lb.-per-week volume. He grouped the expenses into delivery and procurement costs, operating costs, fixed expenses, investment expense, administration, and grade loss.

A new egg-marketing program designed to improve quality and provide producers with premiums based on consumer prices was detailed by E. E. Mason, executive secretary, North Central States Institute. Under the program, all eggs are marked with the farmer's code number, the farmer receives a down payment, and at the end of each marketing period he gets the balance, with candling, grading, processing, pickup and marketing charges deducted. These costs include reasonable returns to the dealer and carlot shipper.

Consumers will eat more chicken, according to J. D. Jewell, J. D. Jewell Inc., Gainesville, Ga., if the industry furnishes them with more ready-to-cook frozen fryers, produced and processed to a stabilized standard and marketed without loss of weight, flavor or quality.

F&DA To Take Long Look At All Lithium Uses

Manufacturers of food and drug products are super-sensitive about marketing a product that is not thoroughly tested for possible bad physical reaction on human beings.

Most injuries or deaths resulting from supposedly harmless foods or drugs are cases in which (1) a poison gets into the safe product by mistake, or a poisonous amount instead of a safe amount of a chemical or drug gets

into the final product by mistake, or (2) an irresponsible outfit markets a new product without testing.

Passage of the present Food, Drug & Cosmetic Act was aided back in the '30's when a Bristol, Va., concern began selling sulfanilamide in a solution of diethylene glycol. The sulfanilamide dissolved well, but its use in this solution resulted in some 77 deaths. It hadn't been tested, either on animals or humans.

But last month (March) the Food & Drug Administration was studying a salt substitute—lithium chloride—which doctors have reported as being responsible for the death of at least three persons, and injuries to a number of others. Some lithium chloride was being used by bread bakers for making salt-free bread. As soon as these deaths were reported, both Food & Drug and the American Medical Assn. publicly warned consumers, druggists, bakers, hospitals, and doctors against its further use.

Bottlers of carbonated beverages, who use lithium compounds for flavoring and carbonation, were also giving thought to the new situation. Food & Drug has its doubts that it could prove that the minute amounts of lithium used in carbonated drinks could be termed dangerous. But its position is this: The new evidence reveals clearly that lithium is deleterious and poisonous, therefore it has no place in a food product.

The bottlers could probably prove that the amount of lithium is so small as to be harmless.

In any case, Food & Drug is first going to clear up the lithium salt-substitute situation before turning to the definitely secondary problems, such as those presented by the beverage bottlers.

F&DA Food Standard

Bread continues to be the most important item on the Food & Drug Administration's program of food standards activities. When the bread hearing recessed on February 25, to resume on March 21, data on toxicology of bread softeners were still being discussed. Every indication was that another two weeks might be required for bread softeners before mono- and di-glycerides or oxidizing agents would be reached on the hearing calendar. Some observers fear that the hearing will last "all summer." Most optimistic viewpoint seems to be adjournment by May.

Canned potatoes were to be discussed briefly at a hearing on March 14, the expectation being that one day would be sufficient for consideration of addition of certain calcium salts as

(Industry News Continued)

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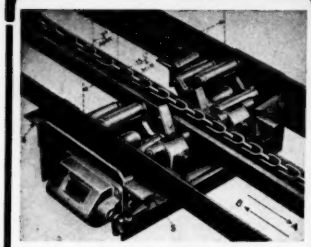

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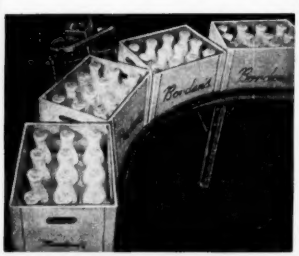

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Fishing Boats Galore

Storms at sea and longest closed halibut season on record made this picture possible early in March. The ships—some 450 of them—were tied up in Seattle's salmon bay awaiting the season's opening. It was the biggest fleet ever moored at the port.

optional firming ingredients in the present standards.

Canned corn was to be discussed at a hearing beginning March 15, and it was hoped that about a week would be adequate for that proposed new standard.

Cheeses were to be covered by a tentative order issued during March. Because of the large number of cheeses involved, a rather lengthy tentative order was expected.

Tentative orders on standards of identity for *salad dressings* and *frozen fruits* were thought to be about a month behind the cheese order.

USDA Grade Standards

Several grade-standard actions were taken during February. Fruit preserves (or jams), canned carrots, and frozen concentrated fresh orange juice were the items of principal interest. Standards for cabbage, fresh peas, celery stalks, and potatoes were also acted upon.

Fruit preserves are now covered by amended grade standards, superseding those in effect since May 15, 1943. The revised standards, published on page 619 of the February 11 *Federal Register*, were to become effective March 14.

Canned carrots are also to be covered by a revision of an existing standard, which has been in effect since July 1, 1940. The proposed revision was published on page 798 of the February 22 *Federal Register*, and written comments were invited until March 24. The revision was said to be "designed to adapt the standards to present-day canning procedures."

Frozen concentrated fresh orange juice would be covered by grade standards for the first time, if the proposal published on page 920 of the March 1 *Federal Register* proceeds as expected. Three grades were proposed: "U. S. Grade A" or "U. S. Fancy", "U. S. Grade B" or "U. S. Choice", and "U. S. Grade D" or "Substandard". Color, Flavor, and absence of defects are the three factors considered in determining the grade of the juice. A numerical scale is proposed with definitions of each factor in such manner that a numerical scoring is possible. Detailed analytical procedures and tables of Brix-acid ratios are included. Written comments were requested by March 31.

Celery stalks are now covered by U. S. consumer standards effective March 27-28, as published on page 852 of the February 25 *Federal Register* (also see page 149, March FOOD INDUSTRIES).

Cabbage standards, which have been in effect since September 1, 1945, and standards for *fresh peas,* which have been in effect since June 1, 1942, were published in the February 9 *Federal Register* on pages 563 and 564. No changes were proposed.

Potato standards are also being amended by action of the Production & Marketing Administration. Following are the principal changes in the

existing standards: (1) A new skinning classification has been added, though it is not an integral part of the grades; (2) tolerance for decay, such as late blight, would be reduced to 3 percent; (3) tolerance for defects has been reduced to 10-percent and 20-percent levels, which were in effect about five years ago; and (4) the potatoes must be fairly clean. The proposed revised standards were published on page 989 of the March 4 *Federal Register*. Written comments were desired by April 4.

DISTRIBUTION

Base Pricing Moratorium Now Eyed by Congress

Since last summer there has been a strong movement afoot to get through Congress, this year, some kind of legislation on the delivered price-basing point problem. Because of the resulting confusion in the minds of many businessmen as to whether their particular system of delivered pricing was or was not legal, many Congressmen were all set to amend the anti-trust laws in order to clear up the confusion.

Now that it seems almost impossible to get such a bill passed, the Administration has given its silent consent to a bill that would provide a moratorium —for a year or so—during which FTC could not act against an individual company if no conspiracy was involved. Anti-Trust Chief Herbert Bergson has said he would not be against such a law, if it was carefully written.

FTC Told Off

The Federal Trade Commissioners would have a tough time putting up any considerable opposition. They recently received severe criticism from the Hoover Commission for what was termed their inefficiency, excessive attention to minor offenses and problems, poor organization, and general lack of effectiveness.

This does not mean that a moratorium bill would go through without a fight. There are still some powerful small business and long-time anti-monopoly Congressmen who will fight a moratorium bill or any other bill restricting the Federal Trade Commission's powers.

Since, however, one of the bill's sponsors is Senator Myers, the No. 2 Administration leader in the Senate, the balance is now swung definitely in favor of the proposal.

The anti-trusters recently won the second decision in their current case against the New York Great Atlantic

(Industry News Continued)

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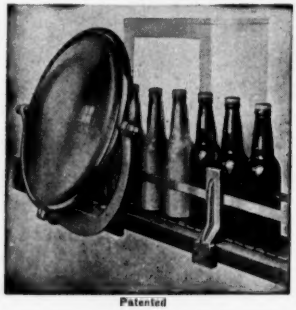

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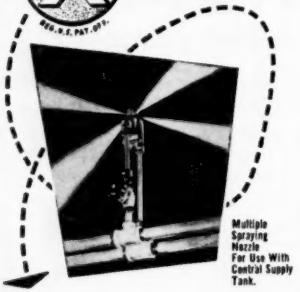

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& Pacific Tea Co. The suit is a criminal action, which the Department of Justice has found to be a kind of case that is harder to win than a civil case. The criminal case asks for fines or jail sentences, while the civil action merely asks the court to order the defendant to stop doing certain things, or asks, for instance, that his business be split up.

Earlier, a Federal District Court decided A&P, because of its dominant position in the industry, is able to control policies and practices in production, processing, manufacturing, and distribution, both wholesale and retail, of food products throughout the United States.

In upholding this lower court decision, Judge Sherman Minton, of the Circuit Court of Appeals in Chicago, said in his opinion: "One cannot escape the conclusion . . . that A&P succeeded in obtaining preferential discounts, not by force of its large purchasing power and the buying advantage which goes therewith, but through its abuse of power by threats to boycott suppliers and place them on its individual blacklist, and by threats to go into the manufacturing and processing business itself. The influence of this ruthless force in the food-buying field was also used to compel suppliers to discontinue practices in their business which might be detrimental to A&P."

A&P contends that it is better to serve a lot of customers at a low rate of profit and low prices than fewer customers at a higher price and higher profits. It points out that independent food stores have increased their share of total food-store business, and that its own share has dropped lower than the aggregate of all the food chains.

It is expected that A&P will appeal the decision to the Supreme Court.

Tell Dairy Processors To Boost Promotion

The dairy industry is faced with a sales and merchandising crisis that will seriously affect every segment, including the dairy farmers, if not met immediately with a successful promotion program, according to Ray Mithun, president, Campbell Mithun Advertising Agency, Chicago.

Speaking before the Tenth Anniversary meeting of the American Dairy Association at the Hotel Stevens, Chicago, Mr. Mithun pointed out that the industry is selling no more butter today than it did at the start of the war. In that time, 30,000,000 babies were born and more than 70,000,000 persons moved, many from rural to urban areas.

He also said that butter is being advertised even less today than it was ten years ago. He stressed that the butter industry is larger than the entire tobacco industry, yet only 1/100 as much money is spent in advertising as is spent by tobacco products of all types.

Owen M. Richards, general manager, American Dairy Association, also elaborated on the great need for better promotion. As a striking illustration, he pointed to the fact that not many years ago lard was an important part of nearly every meal in the American home and sold at a good price. Then vegetable shortenings gained initial acceptance through elaborate advertising campaigns. Today, with continued promotion, these shortenings are selling for about 33c. per pound, while lard commands about 16c.

Officers re-elected were Bryce Landy, Wisconsin Dells, Wis., president; C. R. Schoby, Bode, Ia., vice-president; Wm. Hendrix, Boise, Ida., secretary; Wilbur Sawyer, Chicago, treasurer; and W. J. Murphy, Bismark, N. D., assistant secretary-treasurer.

Candy Conference

Application was recently made to the Federal Trade Commission by the National Confectioners Association for a Trade Practices Conference for the confectionery industry, according to Philip P. Gott, NCA president.

"If, as, and when the Federal Trade Commission accepts this application," Mr. Gott said recently, "a series of conferences will be held with the FTC for the purpose of discussing practices or methods of competition which should constitute the basis for rules."

Study Milk Consumption

The relationship between production and consumption of western milk and dairy products, and how this relationship may change in the next few years, are being studied by the Bureau of Agricultural Economics in cooperation with state university experiment stations. Pullman, Wash., and Corvallis, Ore., are headquarters for this work. Development and test of a method for measuring this relationship, and appraisal of adjustments needed to meet prospective changes in outlets and demand for milk, are receiving special attention.

Acknowledgment

The photograph appearing on the cover of this issue was supplied to FOOD INDUSTRIES by *Science Illustrated*, another McGraw-Hill publication.

Will Study U. S. Research

Dr. Edy Velander, director of the Royal Swedish Academy of Engineering Sciences, a member of the Food Preservation Research Institute newly established in Gothenburg, and a member of the State Council of Technical Research, will arrive in the United States this month to study several research projects, including recent developments in American food science.

RAW MATERIALS

Joint Study To Be Made On Chemical Residues

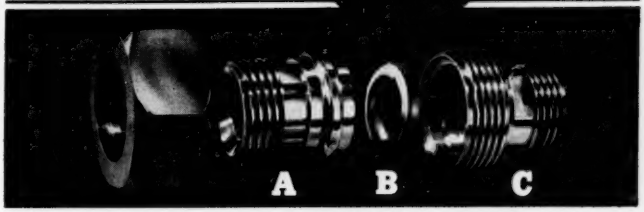
Widespread use of many pest control chemicals is creating potential difficulties for the food business. These problems concern both the insecticide-control officials of the Department of Agriculture and executives of Food & Drug Administration. As a result, these two agencies are now planning a joint inquiry for later this year, at which time public hearings will probably be included. The plan seems almost certain to materialize, because some of these problems are interwoven with the other difficulties that are following the discovery of the toxicity of lithium chloride.

Food & Drug has long studied the spray-residue problem involving fluorine, lead, arsenic, and some other metallic residues. Over a period of years during the 20's and the 30's, these problems caused bitter controversy within and without the government. The armistice reached by fixing of spray-residue tolerances has never settled matters as regards the basic principles involved.

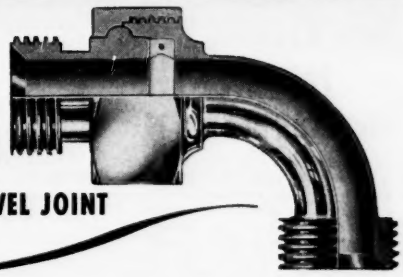
Now there are scores, perhaps hundreds, of new pest-control chemicals utilized in agriculture, during storage and transportation, and in many industrial establishments. The theory has

(Industry News Continued)

Simple as A B C



The CHIKSAN SANITARY SWIVEL JOINT



So simple in design and construction that a simple picture tells the whole story. That's the **CHIKSAN Sanitary Swivel Joint!** It provides complete flexibility for easy turning without leaking and for absorbing vibration, expansion and contraction without strains on pipe, equipment and connections. In addition you get the long life, safety and ease of cleaning inherent in stainless steel. You save money, too, because **CHIKSAN Sanitary Swivel Joints** give you unlimited service at low maintenance cost.

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been held by many that these new control chemicals are vastly superior to the old style compounds which carried potential residues of metals or fluorides. There is now suspicion, though apparently no convincing evidence, that this theory should be questioned.

ECA Wheat Requirements Retain Flour Ratio

A minimum of 15 percent of the wheat shipped under ECA during the coming year will have to be in the form of flour, according to the extension bill reported out by the Senate Foreign Relations Committee. The minimum last year was 25 percent.

This new requirement constitutes a victory for the flour millers' lobby—the only one of 109 various groups plugging for special commodity consideration to score with the committee. Paul Hoffman, ECA administrator, had asked to be relieved of the flour requirement and the committee is reported to have been in agreement with him. Pressure, however, caused the compromise betwen the millers' demand for 25 percent and Hoffman's request to eliminate the requirement entirely.

Meat Research

Special research to determine the chemical and physical bases for tenderness in meat is now underway at Iowa State College. The project, which is concerned with the bearing that connective tissues in meat have upon its tenderness, is being made possible by a $3,000 grant-in-aid given to the college by Swift and Co., Chicago.

The research is under the direction of Prof. Belle Lowe, Home Economics Department, and it will be carried on for a year. Prof. Lowe was the first recipient of the $500 Christie Award given by the Poultry & Egg National Board for outstanding research work.

Cattle-Disease Line Recedes

Hoof-and-mouth disease has been detected in no new areas in recent months. It is anticipated that by July 1 the Joint Mexican-American Commission for control of the disease in Mexico will have gathered sufficient information, including data on the period of immunity following vaccination, to determine whether to continue present methods or modify the plan of attack.

The nearest infected hoof-and-mouth disease territory is now 372 miles below the United States border. That is 124 miles farther south than at the high point in the northern advance of the plague.

Gas Treatment vs. Spoilage

An ozone gas process, developed by Dr. Palmer H. Craig, director of the Electronic Research Lab, at the University of Miami, is being put to its first commercial test. The process is designed to reduce both spoilage and the need for refrigeration of citrus fruits. Dr. Craig is seen demonstrating how his treatment is applied.

Aussies Ask Long Terms On Meat for Britain

MELBOURNE—Australia is bargaining with Britain for a 10-year meat contract as a condition for developing the northern territory pastoral industry. Canberra wants the Ministry of Food to sign on the dotted line before it commits itself to the capital outlay. One thing is certain: The beef-producing capacity of the Territory is capable of tremendous expansion.

Two British firms now enjoy a quasi-monopoly of the northern Australian cattle industry. The Vestey interests hold 23,000 sq. mi. (equal to the area of Costa Rica), and Bovril cattle graze another large chunk of Territory. Leases expire in 1965, and Canberra plans to subdivide the mammoth holdings in the interest of more intensive production. Between them, the two British firms own most of the 970,000 head of cattle in the Territory. There

is much grazing land that could be developed before the big leases expire.

Government plans call for an increase in beef production to 400,000 tons a year. Normally, only 10,000 head of cattle are slaughtered annually, although the kill was easily boosted to 40,000 during the war. Construction of all-weather roads, of railways, and of stock-watering facilities would be necessary before the herd population could be increased. Canberra is prepared to go ahead with the project almost immediately, if there is a guarantee that Britain will take the meat.

Queensland is already swinging into production on an earlier Ministry of Food plan. It provides for a crop of 7,500,000 bu. of sorghum by 1955 to fatten 500,000 hogs annually for shipment to Britain. Also, Queensland is to supply peanuts to Britain's margarine industry.

About 1,000,000 bu. of sorghum grain are due to be harvested from the first 30,000 acres to be put under crop. This will provide feed for 60,000 hogs, equivalent to about 10,000,000 lb. of pork. Most of the grain will be shipped to Britain because there are not yet enough pigs in Queensland.

The British Food Corp. will establish its own piggeries in Queensland soon. The BFC is the British government outfit that backs the African peanut scheme.

List India Resources In New Handbook

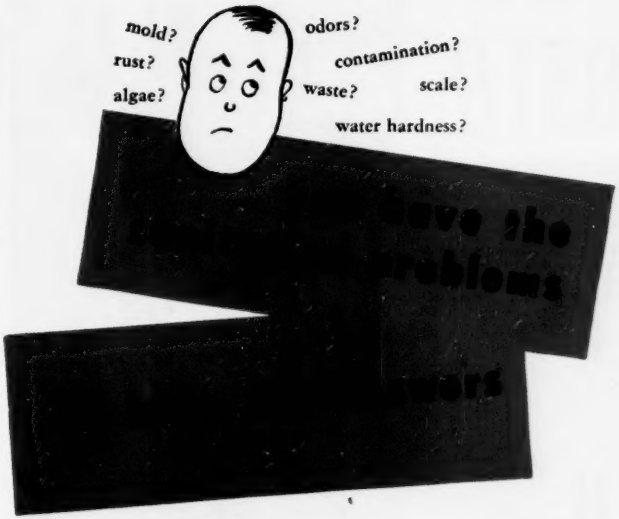
BOMBAY, INDIA — Industrialists, engineers, students and researchers interested in India soon will be able to turn to the first authoritative handbook of Indian natural resources and industrial products to be published in 50 years. Titled, *The Wealth of India,* it

(Industry News Continued)

Eastern Publishers Service

Satellite Salt

Production of salt goes on behind the Iron Curtain. This picture was made recently at the Wieliczka salt mine, in Southern Poland.



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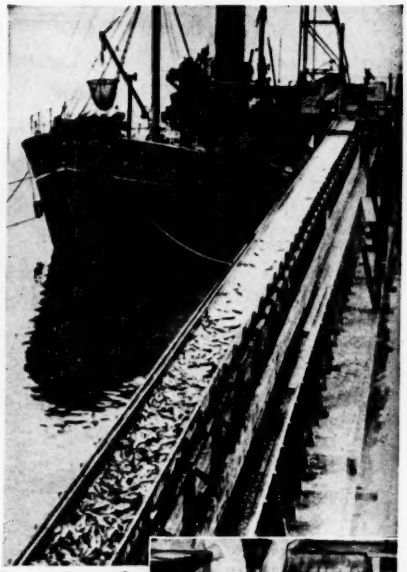

Tons of fish ride from ship to cannery on one continuous, flat strip of solid, stainless steel in this SANDVIK conveyor installation.

Here's another kind of SANDVIK STAINLESS STEEL-BELT CONVEYOR

SANDVIK steel-belt conveyor in a fish packing plant.

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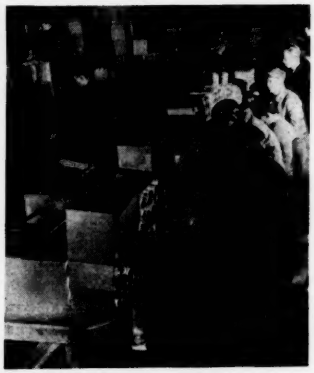


Food Parcels for CARE

New problems in food packaging had to be worked out at this Philadelphia distribution point for CARE shipments overseas. First, the products that go to make up a package must be unpacked, then the alloted units of each repacked. A $1,000,000 stockpile of foods is maintained at the plant. About $70,000,000 worth of food has been shipped since CARE has been in operation.

is the work of the government Council of Scientific & Industrial Research. It is in the form of a dictionary.

The first of six volumes has just been published, dealing with "A" and "B" subjects. Divided into two sections totaling 435 pages, 8½ by 11 in., one portion deals with raw materials and the other with industrial products. The book's articles are based on previously published material, usually up to the end of 1945, and carry references to original sources.

The production of the book is doubly important, because the organization set up to compile it will continue as a central source of fresh information, thus filling a long-felt need for official data on both resources and products of the country.

Cold Storage Shipments Boost Fruit Exports

BUENOS AIRES — With the announcement from Washington that Argentine fruit will be accepted if held in cold storage during the length of the sea voyage (sufficient time to kill fruit flies or larvae), exporters in Buenos Aires have hopes of shipping more off-season fruit to the U. S.

Although Argentine fruit (largely grapes, plums, peaches and avocados) ripens in February and March, making shipment to the U. S. possible when the market is most receptive, the trade

has never been very great because of U. S. import regulations.

However, Argentina paid the expenses for U. S. Department of Agriculture experts to come to the southern hemisphere city and study the situation. It was their verdict that the 20-day voyage to New Orleans or New York under rigidly-controlled temperature of refrigerator ships would eliminate any possibility of fruit flies. Previously fruit had to be stored in cold-storage in Argentina preparatory to shipment.

The Upper Valley of the Rio Negro and Mendoza districts of Argentina are expected to produce 10,000,000 boxes of fruit this season, although only a fraction of this can be expected to reach the export trade. However, the government would probably like to turn it all over to the exporters in order to bring Argentina badly needed dollars.

Ban on Wheat Flour Import Blocks Biscuit Output

BOMBAY, INDIA—The Indian biscuit industry is being seriously handicapped by the government's refusal to allow import of wheat flour on private account. According to the All-India Manufacturers' Assn., the 1948 production of this industry was far below its single-shift capacity of 160,000 long tons of biscuits a year, due to the restrictions.

India will import more than 4,000,000 long tons of food grains during

(Industry News Continued)

Wide World

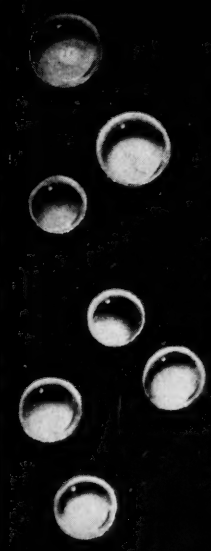
Convincing at That

During the past month, this young lady has been helping the rice industry "convince the American people that they should eat rice at least once a day." Up to press time, no other grain producer had mentioned unfair competition.

CUT COSTS WITH

THE NEW | IMPROVED

PICK-ETS



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The new PICK-ETS are absolutely uniform, perfect spheres, each having exact maximum melting speed. Easier, cleaner to handle, available in GREEN for cold cans, RED for hot cans—AMBER for normal cans—fit the color to the temperature!

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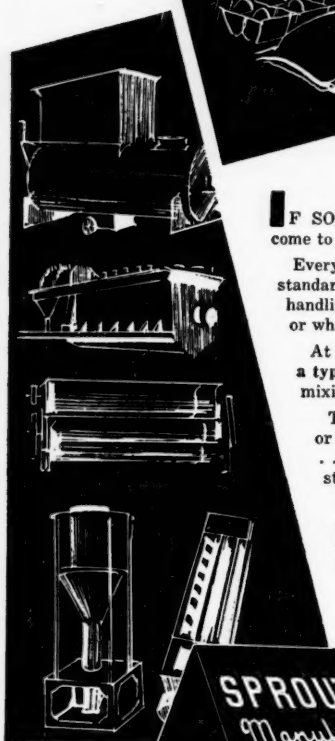
MIXING?



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Wide World

Highly-Touted Orange Spray

Broad claims are made for this navel orange spray said to be composed of extracts of plants that grow wild on the Southwest deserts. Developed by J. A. McAvoy, agricultural chemist, the spray, it is claimed, will prevent water rot, kill red scale, and act as a repellent against red spider. Manufacture of the spray, known as Super X-40, will start soon at the Cactizona plant, Garden Grove, Calif.

---

the current year to bridge the gap between domestic crop production and basic requirements. These imports will be on government account, and official estimates are that as much as $600,000,000 may have to be paid out, much of it in hard currencies.

India Food Processing Shows Good Gains

BOMBAY, INDIA—Several important Indian food processing industries registered significant gains during 1948, according to Industry Department figures.

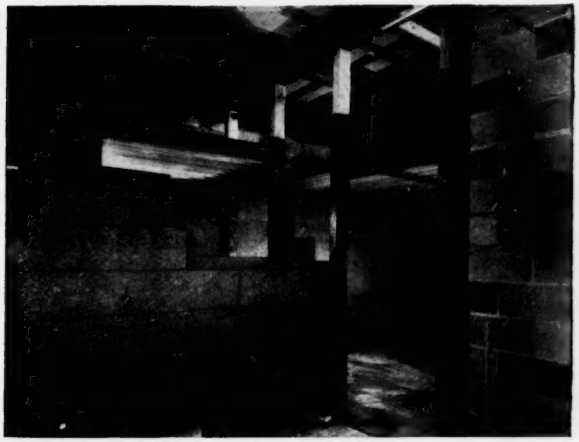
Salt production was up to 2,381,000 long tons, although it still was short 142,000 long tons of requirements based on annual per capita consumption of 14 lb. (compared to the world average of 30 lb). Vegetable oils were up to 145,000 long tons, a rise of 50,000 long tons in a year. Sugar rose slightly, topping 1,000,000 long tons. Alcohol was 8,440,000 Imp. gal.

More P. R. Pineapple

SAN JUAN, P. R. — Approximately 77,000,000 pounds of pineapple were harvested this year in Puerto Rico, and its canneries processed 85 percent of it, according to official sources. Canned production was valued at $4,500,000.

(Industry News Continued)

How cold room door bucks are set and finished



Careful attention to small details is an important part of every good low-temperature insulation job. Take door bucks, for example. The way they are set means the difference between a door that swings easily and true and one that sags or twists and generally works badly.

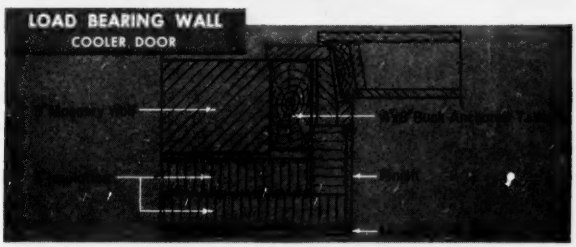
The way the insulation is finished off around the bucks and door frame is important, too. A good, tight job at that point eliminates the danger of hollow spaces where moisture and frost collect and break down insulating efficiency.

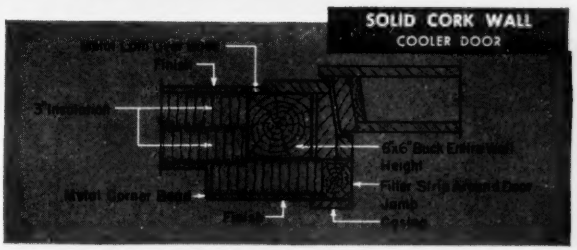
In permanent building walls, the bucks are built right into the wall and well anchored to it. In solid cork partitions or hollow tile walls, the door bucks must extend from the floor to the ceiling and must be securely bolted at both places. Perfect alignment of bucks and lintel is absolutely necessary.

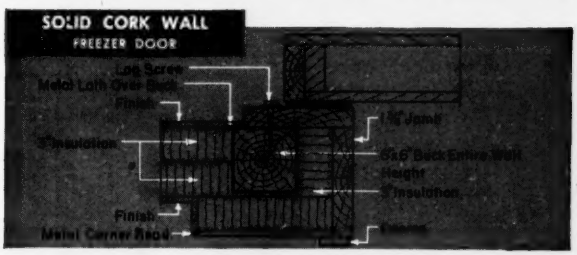
The finishing off of the insulation around the bucks depends upon the type of door used, the type of building construction, and whether the bucks are of wood or steel. The diagrams on this page illustrate a few typical finishing methods.

Correctly setting door bucks and finishing off the insulation around them are jobs for specialists. You can depend on the workmen of Armstrong's Contract Service to get these details right, just as you can depend on them for efficient erection of Armstrong's Corkboard, Mineral Wool Board, or Foamglas* insulations.

If you plan to build or enlarge your low-temperature rooms, it will pay you to get full information on this complete insulation service which includes expert engineering advice and quality materials, as well as skilled workmen to erect them. Write today to Armstrong Cork Co., Industrial Insulation Dept., 3312 Concord St., Lancaster, Pa.







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Food Industry News

Trade Agreement

MELBOURNE—Australia has concluded a seven-year agreement with the United Kingdom for supply of butter and cheese. Prices will be negotiated every year, but there will be no change of more than 7½ percent either way. Under the new contract, Australia gets 15 percent more than was fixed under the recently expired three-year agreement. U. S. and Canadian cheese exports to Britain, already far below 1947 records, are likely to run into stiffer Australian competition because production is expected to respond rapidly to the improved price schedule.

Schedule of Events

April

4- 7—Michigan State College, 6th annual dairy and food inspectors' and sanitarians' school, Department of Bacteriology, Lansing, Mich.
10-12—National Peanut Council, annual convention, Shoreham Hotel, Washington, D. C.
10-14—American Society of Brewing Chemists, annual meeting, Roosevelt Hotel, New Orleans, La.
14—University of Illinois, dairy conference, College of Agriculture, Urbana, Ill.
27-30—National Fisheries Institute, 4th annual convention, Edgewater Beach Hotel, Chicago.

May

1- 4—Southern Bakers Assn., 35th annual convention, Peabody Hotel, Memphis, Tenn.
2- 5—U. S. Brewers Foundation, 73rd annual convention, Waldorf-Astoria, New York City.
8-12—Supermarket Institute, 12th annual convention, Hotel Stevens, Chicago.
9-11—Millers National Federation, 47th annual convention, Edgewater Beach Hotel, Chicago.
10-12—American Oil Chemists Society, 40th annual meeting, Roosevelt Hotel, New Orleans, La.
10-13—American Management Assn., 18th annual national packaging exposition, Convention Hall, Atlantic City, N. J.
15-18—Flavoring Extract Manufacturers Assn., 40th annual convention, Drake Hotel, Chicago.
15-19—American Assn. of Cereal Chemists, 34th annual convention, Hotel Statler, New York City.
17-19—Associates, Food and Container Institute, annual meeting, Navy Base, Norfolk, Va.
20-28—National Pickle Week.
30-June 1—U. S. Wholesale Grocers Assn., annual convention and exposition, Auditorium, St. Louis, Mo.

June

1-30—Dairy Month
5-10—National Confectioners Assn., 66th annual convention and 23rd confectionery industries exposition, Stevens Hotel, Chicago.
6- 8—Grocery Manufacturers of America, mid-year meeting, Cavalier Hotel, Virginia Beach, Va.

—*End*

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Crucial Quality in Flavor Control

Yours with Griffith SOLUBILIZED *Seasonings*

● *Penetration* is the quality a seasoning has when it disperses easily and blends thoroughly with the product. When it's a Solubilized Seasoning, it's a skillfully blended Griffith formula *with* the crucial quality of penetration!

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Solubilized Seasonings are blended by chemists who apply Griffith's unequalled laboratory and commercial experience. Converting ground spice formulae to Solubilized Seasonings is one of their arts. Yet, the quality of every Griffith formula must be proved in the research kitchen.

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The spice extractives in a Griffith Solubilized Seasoning are homogenized—to *blend* them. That process reduces them to tiny globules which really penetrate and flavor your product uniformly.

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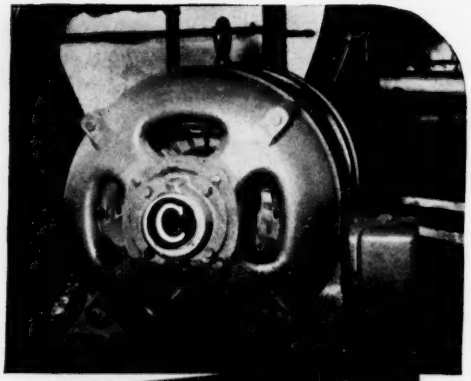
Century 40 horsepower, type SC motor driving an induced draft fan for a stack.



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1. **Right Kind**—*to match your current supply*
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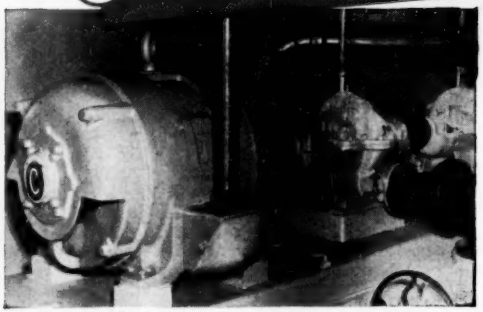
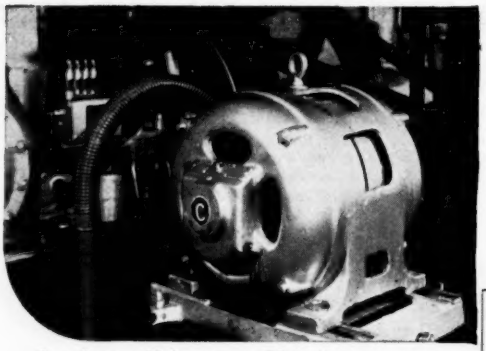
4. **Right Size**—*from 1/6 to 400 horsepower*



Century 150 horsepower, type SC motor driving a two-stage centrifugal pump in a city water plant.



Two Century 75 horsepower SC high torque motors driving refrigeration compressors.

The wide range of kinds, types and sizes of Century motors makes it possible to select a standard motor to meet the requirements of all popular applications.

They are available for both AC and DC current—high, normal and low torque characteristics. Types are also available for applications requiring varying speeds and reversing direction of rotation.

To protect against atmospheric hazards, Century motors are enclosed in open rated drip proof, splashproof, totally enclosed fan cooled and explosion proof frames. Many types are available with vertical and flange mountings as well as standard horizontal bases.

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Changes in Food Supplies

Production

CREAMERY BUTTER production in January rose 10 percent over December. Estimated at 91,895,000 lb., production was 16 percent larger than in January, 1948. A year ago the December-January gain was only 3 percent, while the recent five-year average was 8 percent. Output, however, was 7 percent smaller than the five-year average for the month.

AMERICAN CHEESE output in January, estimated at 61,045,000 lb., was the second highest on record for the month. Output was 34 percent larger than January, 1948, and 29 percent above the five-year average. The seasonal increase was 11 percent, compared with 9 percent a year ago, and 7 percent for the five-year average.

LIQUID EGG production in January totaled 15,026,000 lb., compared with 14,850,000 lb. turned out in January, 1948. Dried egg output came to 2,431,000 lb., as against 552,000 lb. a year ago, while production of frozen eggs during January was 68 percent less than January last year, totaling only 3,430,000 lb., the smallest for the month since 1943.

NONFAT DRY MILK SOLIDS produced in January came to 54,275,000 lb., the largest on record for the month, and 21 percent above the previous high for the month, reported two years ago.

DRY WHOLE MILK production in January, estimated at 11,400,000 lb., was 24 percent greater than in December, but 10 percent less than in January, 1948 and 12 percent under the five-year average.

EVAPORATED MILK output for January, put at 154,000,000 lb., was 13 percent below a year earlier, 25 percent under the five-year average, and the lowest January production since 1939.

CANNED CONDENSED WHOLE MILK production in January was the highest for the month since 1930. Totaling 10,950,000 lb., output was 12 percent higher than a year ago, and 24 percent above the five-year average.

POULTRY, canned or used in canning, totaled 9,665,000 lb. in January, a drop of 12 percent from the 10,984,000 lb. turned out during January 1948.

CANNED TOMATOES packed in 1948 amounted to 24,393,000 cases, on a 24/2's basis, according to the National Canners Assn. This was about 11 percent below the 1947 pack of 27,709,000 cases.

TOMATO PULP pack in 1948 was the smallest since 1941. On a 6/10's basis, the pack came to 2,789,605 cases, 36 percent less than last year's pack of 4,414,326 cases, in NCA's compilation.

PUMPKIN AND SQUASH packed in 1948 totaled 1,449,540 actual cases, about 41 percent under the 1947 pack. With large stocks carried forward, however, the supply is greater than a year ago.

Storage

FROZEN FISH AND SHELLFISH held in storage February 1, amounted to 127,410,960 lb., compared with 112,045,665 lb. held on Feb. 1, 1948.

COLD STORAGE OCCUPANCY was below average for both coolors and freezers at the beginning of February. Cooler occupancy declined 2 points to 52 percent during January, which was 14 points below the average for February 1. Freezer occupancy dropped 1 percent to 71 percent, 12 points under the average.

Indexes

The commodity index for foods compiled by the New York Journal of Commerce, stood at 179.8 for the week ending March 11, which compares with 179.0 for the previous week, 175.7 for February, and 196.6 for March, 1948.

Business Week's index of business activity was 198.0 for the week ending March 5. Previous week, revised was 198.3, a month earlier, 199.4, and a year earlier, 197.0.

CONSTRUCTION

	Pending (thousands)	Total Awarded Mar. (thousands)	Total Awarded 1949 (thousands)
Bakery	$168	$80	$1,368
Beverages	1,323	279	4,743
Canning and Preserving	100	.....	115
Cold Storage	.....	600	1,375
Confectionery	.....	.....	550
Grain Mill Products	2,495	344	1,569
Ice, Manufactured	.....	.....	.....
Meats and Meat Products	.....	68	1,421
Milk Products	300	225	1,195
Miscellaneous	200	907	3,546
	$4,486	$2,503	$15,882

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VIBRATORY FEEDERS

Up to Hundreds of Tons Per Hour
Instant Control of Flow

Handling food materials — hot or cold—dry or damp—to driers, mixers, belt conveyors, packaging machines, etc.

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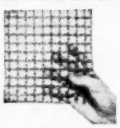

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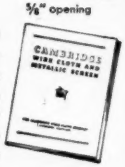

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

What Washington Thinks

By R. S. McBride, Washington, D. C.

CHANGED RELATIONS—Shortening manufacture used to be the major use of cottonseed oil. Now it is a rather poor third behind use for cooking and salad oil and for margarine. These latter two applications are now about tied at a level fully 50 percent above the shortening usage. Legislators in Congress from southern states are keenly aware of this changed relationship. It accounts for a significant part of the interest of southern members in adjustment of the margarine tax situation. When margarine accounted for only 10 percent of the total use of cottonseed oil, as in the '30's, these folks did not think of margarine taxes as being a serious question. Not so now.

STORM LOSSES—The loss of cattle, calves, and sheep in the unprecedented blizzards of the midwest and mountain country represents a stupendous setback for that area. It will take considerable time to restock the area to normal. But the losses do not represent an alarming national problem. Washington officially says that storm losses, ranging from 2 to 5 percent of the regional animal population, are essentially a local problem. This conservative interpretation can well be noted by all those who directly or indirectly use or compete with the meat produced from the range areas affected.

NEGOTIATED CONTRACTS—Many of the military requirements of Army, Navy, and Air Force may be met by supplies or services purchased under contracts negotiated with operators, rather than by competitive bids. Much of the specialized food buying is of this sort. This gives special significance to the new regulations of National Military Establishment on procurement by negotiation. The new rules apply to both goods and services, including research services. Interested sales and technical executives should do a bit of homework on the *Federal Register* of February 8.

PRICE SUPPORTS—The full effect of declining prices of agricultural products on federal price support programs is not yet known. It will be months, possibly a year, before one can fully judge what the downward trend in grain and other commodity markets is to mean. But already one very clear new factor is noted in Washington. Secretary of Agriculture Brannan is becoming an increasingly important individual in the planning phases of our national economy. His ideas and his actions on commodity price supports are worthy of the most careful attention and thoughtful study. Mr. Truman is likely to follow him in these matters.

STANDARDS RECORD — There is now available a complete list of the Food & Drug Administration's "Definitions and Standards for Food". Previously, anyone wanting to find a list of standards had to search through many issues of *Federal Register* or use a lot of loose leaf supplements. Now those who have this kind of homework to do should get and use Food, Drug, & Cosmetic S. R. A. No. 2, Revision 1. Although it is nominally complete only through Oct. 30, 1948, it is actually substantially complete up to March 1 of this year. A big improvement!

SLACK FILL—Meat inspection officials have been warned by Washington to stop use of cans capable of holding 4 oz. of sausage when filled with only 3½ oz. Use of cans of size 208 x 208 for less sausage than they will hold "results in a deceptive fill" even when correctly labeled as to net weight content. Thus BAI adopts the idea long followed by the Food & Drug Administration in attempting to prevent "an economic cheat."

TAX CHANGES—Forecasters, like pollsters, are logically in disrepute about Washington. But it seems safe to repeat some forecasts which are generally believed credible by those following tax arguments in the Capital City: Personal income taxes will not be raised this year. Corporation income taxes may, but it is not as likely as the True Deal folks would have one believe. Correction of administrative tax rules, passed by the House a year ago, is likely to meet Truman opposition this year because some of the changes give taxpayer relief. One very safe forecast is that there will be more noise than amendments affecting tax laws.

PALATABILITY—Federal official action to prevent use of lithium chloride for food seasoning has an important significance generally un-noted throughout the food business. Probably never before has there been such

a spotlighting of the fact that palatability of food may become a more important consideration in the well-being of consumers than any other single factor. Anyone who has been on a saltfree diet for a while can well understand this. Washington has not emphasized—but it very well might—that the lithium chloride case suggests the need of savoring of all foods to secure greater palatability. This is important if the American people are going to take advantage of the most generous diet opportunity that is available to any nation in the world. Incidentally, greater palatability outsells your competitor—if one wishes also to be mercenary in his argument.

MORE FAT AND OIL—All international allocations of fats and oils were discontinued by FAO during February. Thus the world situation as well as that in the United States returns closer to normal.

POLLUTION INDEX — Fermentable wastes are often the most objectionable components of food-plant effluent. As official studies of waterways become more general under the new anti-pollution laws, these wastes are going to be among those first surveyed. Any food plant that wants to know how it will fare when official studies are made, may well investigate the fermentable material contained in the plant sewage. Incidentally, and sometimes profitably, recovery of these materials as industry by products should be considered. Furthermore, remember that one does not need to go into the alcohol business to use them.

NEW FUEL SUPPLY—A very large number of city utility companies are shifting over from manufactured gas to a supply of natural gas brought by long-distance pipe lines from Texas and other southwestern areas. In many cases this shift in gas supply is going to modify significantly the rate schedules of the local utilities. One can get advance notice of such changes because local firms can be supplied only when pipe-line companies have Washington approval through a certificate of convenience and necessity for new lines or new line capacity. Food plants should concern themselves with such changeover. Especially will it be important when a food factory has a high summertime fuel demand. Customers of that sort will be more than ever welcome at the gas company office; and they may get very favorable gas price schedules.

—*End*

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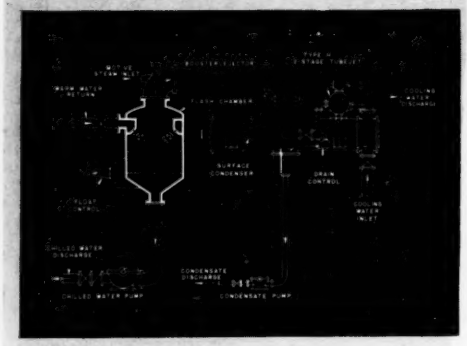

Diagram above and photograph below show C. H. Wheeler Steam Jet Vacuum Refrigeration System employing a Surface Condenser. Low Level Jet and Barometric Jet (Direct Contact) Condensers are also used, depending on the installation requirements.

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Industrial Steam Jet Vacuum Refrigeration Systems, when compared with mechanical types of refrigeration, are lowest in purchase price, lowest in installation cost, and lowest in maintenance. Operation is simple and service life is long. Water is the refrigerant, thus the hazards of noxious or poisonous ammonia, sulphur dioxide, carbon dioxide, etc., are eliminated. Cooling is by the well-known basic principle of Flash Evaporation, using exhaust or live steam, as fully explained in our Catalog No. 1462, sent on request. C. H. WHEELER Steam Jet Vacuum Refrigeration Systems can be applied successfully to many processes such as wort cooling in the brewing industries, cooling of milk, and supplying cold water in connection with the refrigeration and air conditioning requirements of many food products. Write for more information about its application to your cooling problem.

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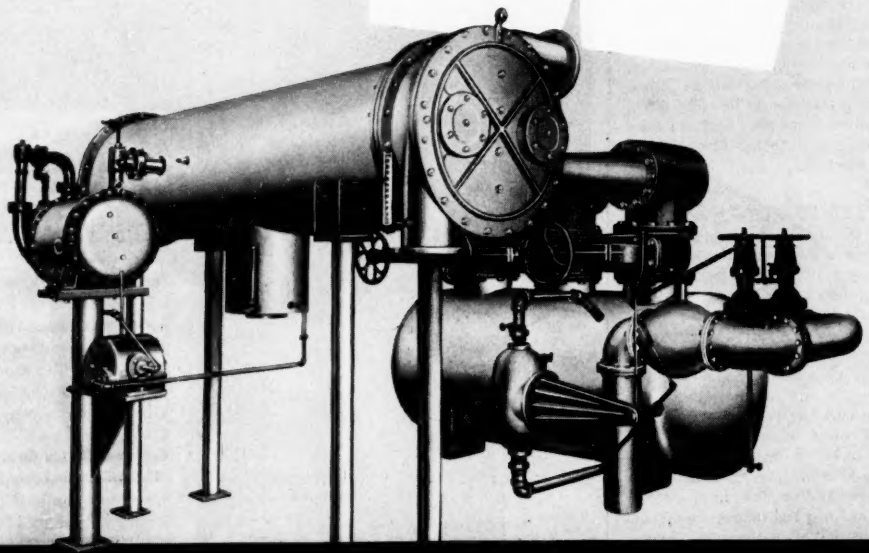

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Men, Jobs, Companies

CHARLES P. McCORMICK, president of McCormick & Co., Baltimore, has been recommended by the National Chamber and the NAM to be U. S. employer delegate to the International Labor Conference in Geneva.

NORMAN E. DANIELS, assistant purchasing director with H. J. Heinz Co., has been promoted to general manager of purchases. He succeeds J. G. Bennett, who retired after 44 yr. of service.

C. E. RICH, formerly with Ogilvie Flour Mills Co., Ltd., Montreal, has joined Day Co. of Canada as director of research and development. An expert on milling technology, he will also act as engineering consultant.

HOWARD J. DIRKES, president of Pioneer Ice Cream Division of the Borden Co., becomes chairman of the firm's Ice Cream - Eastern District succeeding H. C. Fauerbach, who has now retired.

Industry

Bedford Products, Inc., Dunkirk, N. Y., has announced purchase of the plant and assets of the American Grape Juice Corp., Fredonia, N. Y.

Borden Co.'s Lakeshire Marty division, announces the sale of its creamery at Monroe, Wis., to the Dairy Products Co. of Freeport, Ill.

Buffalo Frozen Food Co. has begun construction of a strawberry processing plant at Little Rock, Ark.

Canada Dry's new $500,000 plant at Rochester, N. Y., has now begun operations.

Columbia Baking Co., Atlanta, Ga., which operates 17 plants in the southeast, has changed the package design for all its products in celebration of its 25th birthday.

Dewkist Packers, Inc., of Sumner, Wash., has purchased the properties and facilities of Washington Packers, Inc., from the Seattle First National Bank.

Dodge & Olcott, Inc., New York City, announces the opening of branch offices in Atlanta, Dallas, and Cincinnati.

Farmer Bros. Coffee Co., Los Angeles, has started construction of a new coffee processing and shipping plant on a 25-acre site near the city.

General Baking Co. is constructing a $1,000,000 addition to its plant in Richmond, Va.

Kraft Foods Co., has moved the processing and manufacturing operations from its Green Bay and Plymouth, Wis., plants to Chicago in order to centralize production in new facilities. The Wisconsin plants will continue to operate as receiving and procurement centers.

Heekin Can Co.'s new manufacturing plant, representing an investment of $2,500,000, at Springdale, Ark., is reported to be nearing completion.

National Tea Co., Chicago, has purchased a building formerly used by Studebaker Corp. and will move all its operations to it.

Paramount Pickle Packers, Inc., has been incorporated in Detroit to make and sell pickles, relishes, and other food products.

Olympic Pickle Co. was recently incorporated at Kent, Wash., with a capital of $100,000. C. Wendell Barnes will be the president of the newly-organized firm.

Quartermaster Food & Container Institute, Chicago, announces new staff additions. D. R. Peryan, formerly with Seagram Distilleries, will head psycho-physical section of food acceptance research branch; Barbara C. Heiberg, former USDA plant pathologist, will work in histology section of microbiological branch; S. McElroy, Jr., will be in physiological section of nutrition branch; and R. I. Meyer has been added to the dairy, oil and fat products branch.

Shotwell Manufacturing Co., Chicago, is constructing a four-story addition to its plant.

Soyafeed & Oil Corp., East St. Louis, Ill., has awarded a contract to the Chemical Plants Division of Blaw-Knox Co. to design and construct a modern, 200-ton-per-day soybean extraction plant.

White Rock Corp. announces completion of an expansion program which will centralize flavor concentrate production and laboratory control facilities at its enlarged plant at Brooklyn, N. Y.

White Canning Co., Vienna, Ga. is reported to be constructing a pimiento canning plant at Spence Field, Moultrie, Ga.

Maple Leaf Milling Co., Ltd., Toronto, Ont., announces appointment of the Hon. G. P. Campbell and H. N. Bawden as directors of the firm.

Mount Royal Dairies & Co., Ltd., Montreal, Canada, announces appointment of Jean Louis Amyot as a company director.

June Dairies of Miami, Fla., has awarded a contract to the Edwards

(Men, Jobs, Companies Continued)

Self-Cleaning

DAY

AIR-LIFT ELEVATORS

Eliminate Cleaning Between Batches!

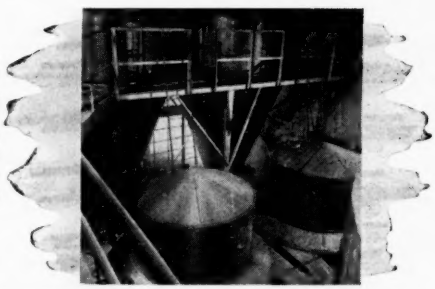
DAY Air Lift Elevators offer food processors cleaner, more efficient and flexible bulk material handling with lower maintenance costs. **DAY** pneumatic conveying systems are designed for processes requiring conveyance of loose, dry, bulk materials. The **DAY** Company has facilities for engineering and manufacturing complete pneumatic conveying systems including fans, DUAL-CLONE dust separators and automatic-continuous dust filters.

A typical **DAY** Air Lift Elevator operation is illustrated above. This system saves the expense of cleaning elevator boots and buckets between batches, and allows more efficient handling of bulk materials. The flexibility of **DAY** pneumatic conveying systems permits material to be easily transported around obstructions. Conveying lines are on positive suction to eliminate dust as materials are moved.

This **DAY** installation uses a 15 HP motor to elevate 10,000 pounds of material per hour. The **DAY** exhaust fan shown in the doorway sucks material and air up through the pipe (farthest right) into a **DAY** DUAL-CLONE separator. Material is then trapped out at the DUAL-CLONE into a turnhead for spouting into any of ten hoppers.

NO MATERIAL GOES THROUGH THE FAN.

Complete dehydrating system fabricated and installed by one supplier. **DAY** Company fabricates stainless steel up to 10 gauge for any branch of the food industry.



DAY engineers have specialized in air engineering for the food, seed and grain industries since 1881. For engineering assistance and cost estimates, *Write-to-***DAY**.

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Branch plants in Fort Worth, Buffalo and Welland, Ont.

DR. DANIEL MELNICK has resigned as chief of food development division, Quartermaster Food and Container Institute, Chicago, to become chief technologist with The Best Foods, Inc., Bayonne, New Jersey.

Construction Co., Coral Gables, for the building of a $225,000 dairy plant.

Personnel

Howard G. Dick has been appointed marketing manager of Vacuum Foods Corp., packer of Minute Maid orange juice concentrate.

James M. Elliott, president of the J. F. Jelke Co., Chicago, a subsidiary of Lever Brothers, has been elected a director of the parent company.

Sidney Hodkinson has been appointed vice-president and general manager of Southern Biscuit Co., Richmond, Va.

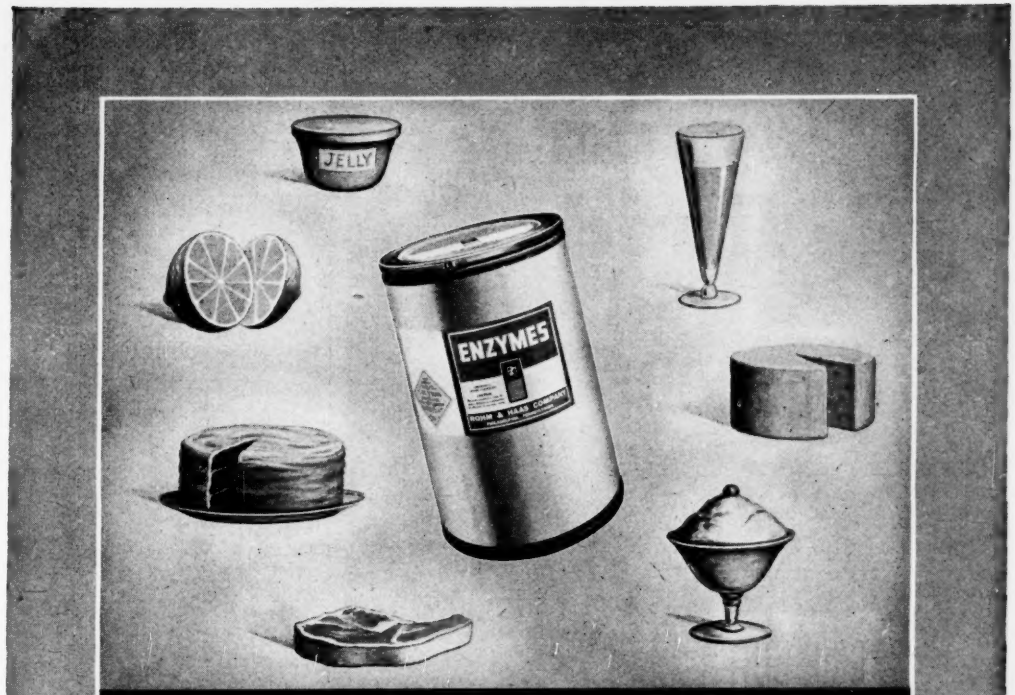
A. J. Hoefer has been elected a director and A. C. Verbeke a vice-president of Libby, McNeill & Libby, Chicago, to fill vacancies created by the recent death of Scott A. Holman.

Milton Hult has been elected president, for the 13th time, of the board of directors of National Dairy Council, Chicago. Other officers elected were: Ken Geyer, first vice-president; Ridgway Kennedy, second vice-president: Wilbur Carlson, secretary; and George Wallis, treasurer.

William M. Kline has joined Seabrook Farms, quick-frozen food producer of Bridgeton, N. J., as director of marketing.

John L. Locke, president and general manager of Fisher Flouring Mills Co., Seattle, has accepted nomination for a second term as president of the Millers National Federation.

(Men, Jobs, Companies Continued)



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No one knows all the answers when it comes to the potentialities of commercial enzymes in food processing. But our experience and research may well be the means of saving you much time and trouble.

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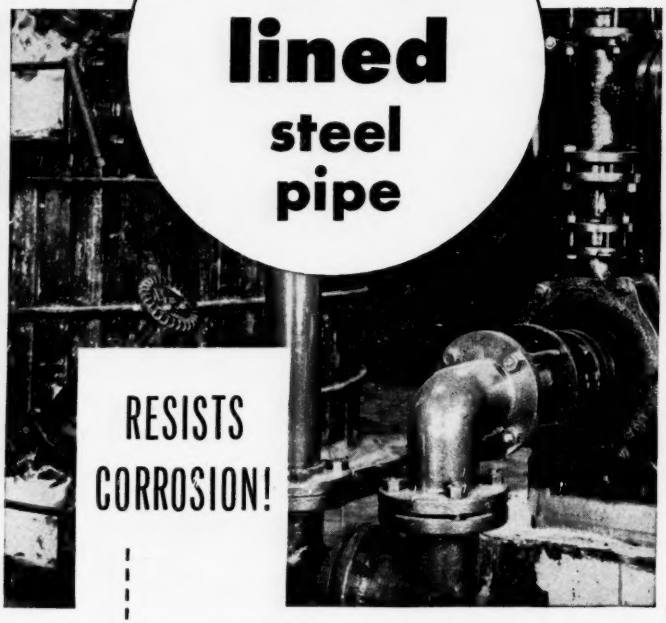

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CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

Men, Jobs, Companies

John A. McDougald, vice-president of Taylor, McDougald & Co. Ltd., has been elected a director of Canadian Food Products, Ltd.

Fred Meyer, president of Red Dot Foods, Inc., Madison, Wis., was elected president of the National Potato Chip Institute at the annual meeting in Chicago.

Thomas W. O'Connor has become assistant to the general manager of the Birds Eye-Snyder Division of General Foods Corp.

Richard G. Parker has been appointed manager of the Douglas Pectin plant, Cobourg, Ontario.

John R. Rhamstine has been elected a director of the Corn Products Refining Co., Argo, Ill.

Charles F. Scully has been elected president of the Williamson Candy Co., Chicago. He succeeds George H. Williamson, founder, who becomes board chairman.

J. T. Webster, manager of Cudahy Packing Co's. foreign department, has retired. He will be succeeded by his former assistant, R. P. Ivens.

Dr. William J. Shannon, former assistant director of research with Oscar Mayer & Co., Madison, Wis., was recently appointed general product controller for the firm. February issue of FOOD INDUSTRIES erroneously reported his new post to be general production controller.

Eric A. Johnston, president of Motion Picture Assn. of America, Inc., has been elected to board of directors of McCormick & Co., Baltimore spice maker.

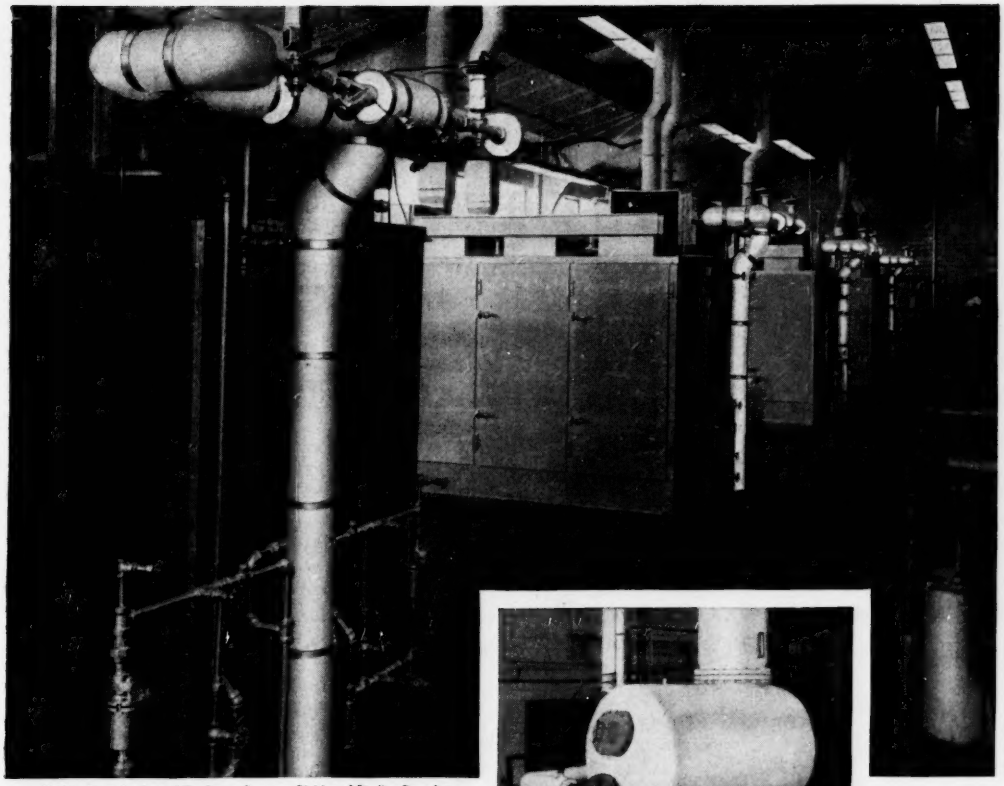
Associated Industry

Baker Refrigeration Corp. is new name adopted by Baker Ice Machine Co., Inc., South Windham, Me.

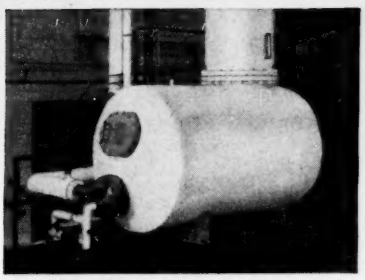
E. W. Bliss Co. announces that Louis C. Edgar, Jr., has become president. Only 38, he is the youngest Bliss president since Eliphalet Bliss founded the concern 90 yr. ago.

Bemis Bro. Bag Co. announces that H. V. Howes, vice-president and director of sales for the firm, has been elected president of Textile Bag Manufacturers Assn.

(Men, Jobs, Companies Continued)



Drying closets in plant of The Bayer Company Division of Sterling Drug, Inc., Trenton, N. J. The 60-lb. steam pipes are covered with K&M "Featherweight" 85% Magnesia Insulation, 2 inches thick, canvas pasted and banded.



Reclaim Solvent Still in the Trenton plant. Tank and tower are insulated with 2-inch 85% Magnesia Block, finished with asbestos cement; steam line with 2-inch thick 85% Magnesia; return line with Standard Thick 85% Magnesia.

Where temperature control is important—

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

K&M best in asbestos ®

K&M "Featherweight" 85% Magnesia Pipe Insulation

In the Trenton, N. J. plant of The Bayer Company Division of Sterling Drug, Inc. temperature control is vastly important. Insulation of *known* dependability is essential.

K&M "Featherweight" 85% Magnesia Pipe Insulation was used because in a wide variety of applications it has proved efficient and durable. It combines the high insulating properties of basic Carbonate of Magnesia with the proper amount of clean Asbestos Fibre as a binding element. It is extremely light in weight, easy to apply, fire-proof, mechanically strong. And is supplied in a wide range of sizes and weights.

K&M Distributors, located strategically throughout the country, are experts on the application of K&M insulating materials. Let them help you make important savings in your plant. Write us for further information.

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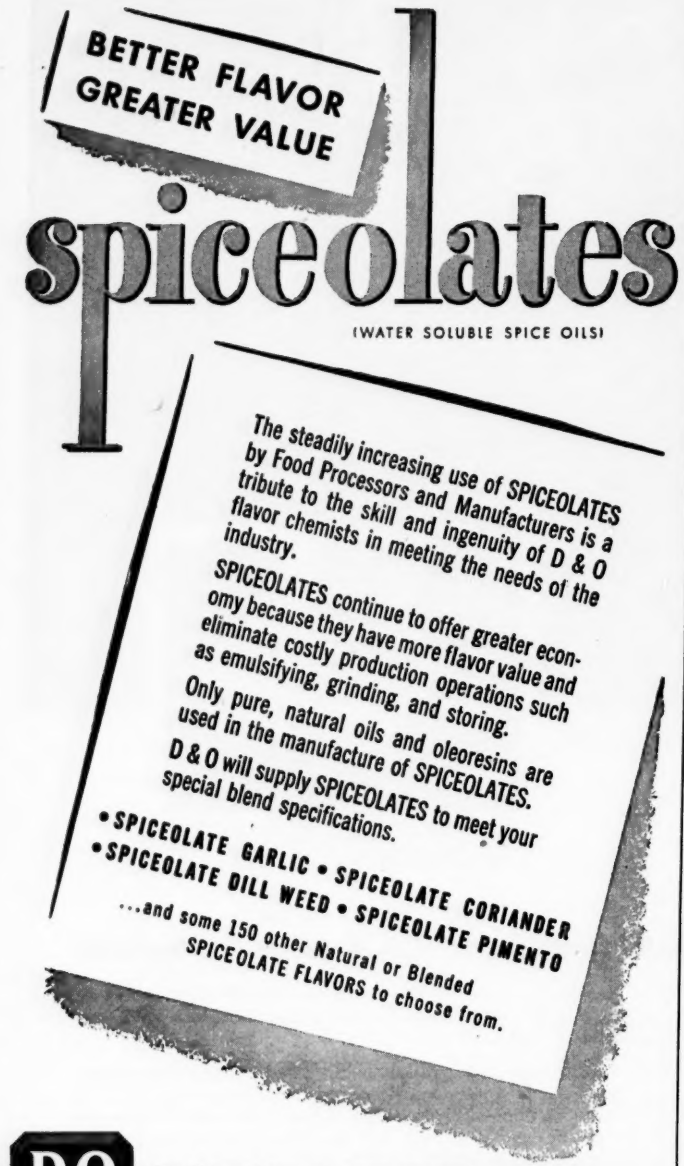
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(WATER SOLUBLE SPICE OILS)
The steadily increasing use of SPICEOLATES by Food Processors and Manufacturers is a tribute to the skill and ingenuity of D & O flavor chemists in meeting the needs of the industry.
SPICEOLATES continue to offer greater economy because they have more flavor value and eliminate costly production operations such as emulsifying, grinding, and storing.
Only pure, natural oils and oleoresins are used in the manufacture of SPICEOLATES.
D & O will supply SPICEOLATES to meet your special blend specifications.
• SPICEOLATE GARLIC • SPICEOLATE CORIANDER
• SPICEOLATE DILL WEED • SPICEOLATE PIMENTO
...and some 150 other Natural or Blended SPICEOLATE FLAVORS to choose from.

D&O

DODGE & OLCOTT, INC.

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Men, Jobs, Companies

Benj. C. Betner Co., bag manufacturer with main factory and offices in Devon, Pa., announces completion of a new branch plant in Paris, Tex.

Crown Cork & Seal Co.'s Closure Division announces appointment of Donald A. Kuchukas as sales representative in the Chicago territory.

Gits Brothers Mfg. Co., Chicago, has named Frank A. Kovarik general sales manager to establish and manage a new branch office in Ludington, Mich.

Karl Kiefer Machine Co. announces that its representatives for the Illinois, Wisconsin and Minnesota area—Burnard C. York Packaging Machinery Co.—has moved to new quarters at 5807 W. North Ave., Chicago.

White Cap Co. reports creation of a new executive post—General Sales Manager—to be filled by John C. Swift.

Deaths

Crosby Gaige, 66, food consultant, gourmet, cook, prominent writer and editor—in the Peekskill, N. Y. hospital, Mar. 8.

Edwin W. Cline, 53, executive vice-president of Bunte Bros. Candy Co., Chicago—Feb. 11.

Henry J. Ebert, 67, retired superintendent of Ambrosia Candy Co., Chicago—Feb. 1.

S. Milton Griscom, 54, president of Brandywine Mushroom Cannery, West Chester, Pa.—at Chester County Hospital, Feb. 5, from injuries received in auto accident.

Christ Lisberg, 64, founder and president of Saratoga Meat Products Co., Chicago—Jan. 30.

Harrell H. Neel, 54, vice-president and a director of National Dairy Products Corp.—suddenly in New York City, Feb. 23.

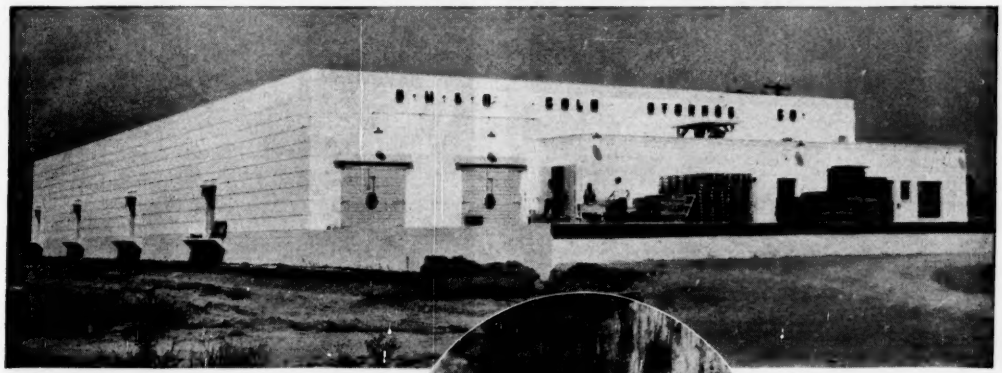
Reymond A. Peters, 65, prominent ice cream executive—in Buffalo, N. Y., Feb. 18.

Frank Pilley, president of Frank Pilley & Sons, Sioux City, Iowa, and former president American Butter Institute—Feb. 5, in Sioux City.

—*End*

Costs less to build, Costs less to run...

IT'S FIBERGLAS-INSULATED



Architect: Thomas A. Kendall, Los Angeles

Contractor: Trewitt, Shields & Fisher, Fresno

Insulation Contractor: Industrial Insulation Co., Fresno

The insulation in this 150-car B.H.&O. Cold Storage Plant at Fresno, California, offers a cost-cutting answer to your insulation problem, whether you process foods, handle meat, make beer, or bottle milk. The insulation is Fiberglas* AE (Asphalt Enclosed) Board in the walls, and Fiberglas Roof Insulation on the roof deck.

You will save money on construction and on operating costs by telling your architect, engineers, and applicators to specify Fiberglas Insulation wherever low temperatures must be maintained. The light weight, high vapor-seal barrier and good structural qualities of Fiberglas AE Board make it easier to handle, cut, and install. And its superior thermal efficiency reduces the power required for compressors to maintain low temperatures.

All Fiberglas Insulations are basically glass in the form of fine strands that are resilient, impervious to rot and mildew, will not absorb moisture in the glass fibers, won't spall and disintegrate if inner-wall frost develops.

Roofs stand up better when you have Fiberglas Roof Insulation between the deck and the weather layers. It's competitively priced and reduces the cost of roof maintenance. Qualified roofing contractors in all larger towns can quote on your plans, will give you prompt service on roofing jobs.

There's a Fiberglas Insulation for practically all your insulation needs . . . hot or cold. Your architect and builder have data on Fiberglas Insulations. Or call the local Owens-Corning Fiberglas Sales Office, located in 27 cities. OWENS-CORNING FIBERGLAS CORPORATION, Department 2009, Toledo 1, Ohio.

Write for this 32-page booklet of illustrated "how-to-do-it" information on the application of Fiberglas Thermal Insulating Materials for all types of low-temperature structures.

OWENS-CORNING

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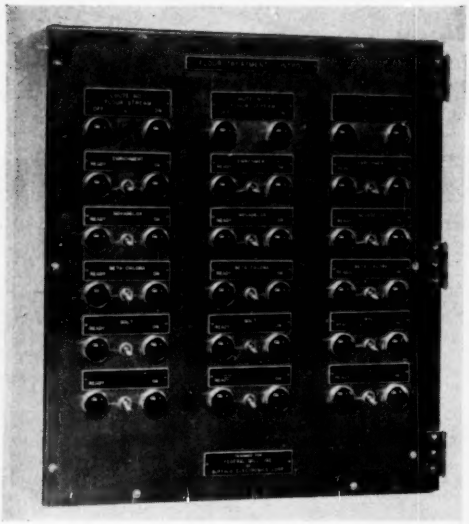
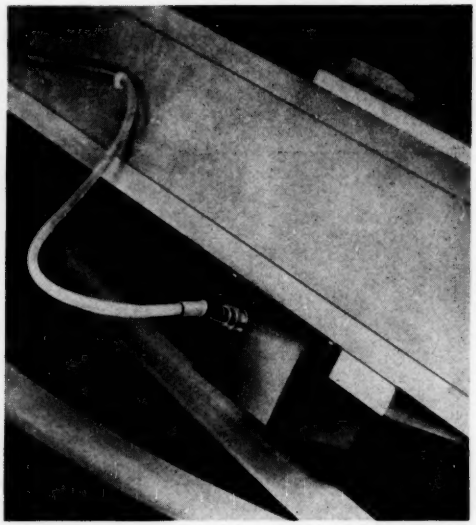
LOW TEMPERATURE INSULATIONS

*FIBERGLAS is the trade-mark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

Food Equipment News





Electronic Flow Detector

Bringing new production economies and uniformity of quality to the milling industry is a new electronically operated flow detector and control system.

Designed to automatically synchronize two or more materials, the Signa-Flow system shuts off feed lines in any given mix when a flow stoppage occurs in any line from clogging or other causes. Then it resumes operations automatically, once stoppage is cleared.

According to maker, unit's sensitivity can detect flow or non-flow of any ingredient, even when flow is as slight as a few ounces per minute. Since unit operates only by action of moving material, any choke-up will be indicated on light panel.

Horns and vari-colored lights warn of blending irregularities in complex mixtures. Light panels are placed at strategic locations so that a quick glance tells operator where trouble lies. These visual and audible signals warn operators when and where trouble has occurred, allowing them to take precautionary measures before serious losses develop.

In addition to protecting blend uniformity, this detector system reduces operating costs by eliminating material waste and reducing "take-out" volume.—*Buffalo Electronics Corp., 429 Southwood Drive, Kenmore 17, N. Y.*

Gyratory Sifter

Offering various advantages to millers and food processors is a new all-metal low-head gyratory sifter of lighter overall weight than the standard wood constructed unit.

Among advantages noted are greater sanitation in grading and resifting, greater resistance to abrasive materials, easier cleaning, and high temperature operation.

All riveted joints on the new sifter are gasket-sealed, eliminating all unnecessary cracks and crevices. Sifter box and sieves—each sifter holds 4 to 7 sieves—can be easily cleaned with air or water. A unique device eliminates the use of tacks for attaching cloth to the metal frames. Two-piece construction permits access to all parts of the sieves for easy cleaning.

The sifter can be operated on products in excess of 125 deg. F., according to the company's engineers. It is powered by a 1-hp. explosion-proof motor with Texrope drive.—*Allis-Chalmers, Milwaukee.*

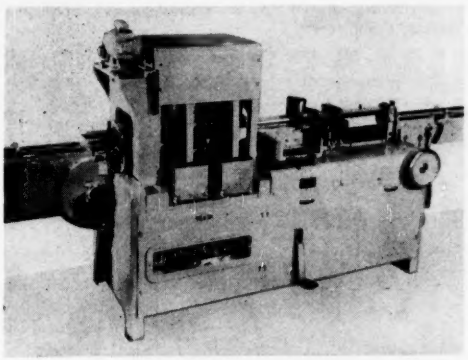
Multi-Pocket Plunger Filler

To meet requirements for a high production plunger type filler for liquids and semi-liquids—such as baby foods, apple sauce, oil, etc.—a 20-pocket capacity machine has been developed.

Provided with either a chute feed (for cans) or a belt feed (for glass jars), this machine will handle a range of sizes from 2⅛ in. to 5⅝ in. in height variations. Unit is designed for speeds to 450 cans or jars per min.

Entire machine is supported on a cast iron base plate, and all operating parts are vertically adjustable, with the exception of the central supporting column, can table, and driving pinion. Variations in can heights can be quickly accommodated by a single lever on outside of base. No-can-no-fill mechanism and adjustable filling are features on all fillers offered.

Non-corrosive materials are used throughout. All parts, with exception of main base, drive gear, and filling cam, are made of either bronze or stainless steel. Automatic lubrication insures constant supply of lubricating oil. Lower portion of machine is closed by demountable guards easily removed for maintenance.—*Food Machinery & Chemical Corp., Sprague-Sells Div., Hoopeston, Ill.*



Labeling Unit for Rectangular Containers

A new labeling machine for rectangular base containers is announced. It is reported to combine simple operation, low maintenance, accurate registry of the label, high operating speed, and easy adjustment for all height containers. Output is approximately 130 containers per min. after closing and before freezing.

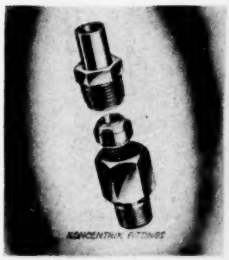
By simple adjustment of a thermostatically controlled heater, the glue temperatures may be brought up so that labeling of frozen foods is handled at higher speeds.

Each container to be labeled is fed into the machine on an intake conveyor which is approximately 5 ft. long, then passed through the indexing mechanism, which times the container with the chuck or carrier member. Mounting the chuck, the container is carried forward through the adhesive-applicating mechanism, where glue is applied in an all-over pattern to its sides.

Progressing through the machine, the container is rotated to a position where it contacts the label stack, making the label pick up. As rotation is continued, the label is drawn from the magazine and wrapped around the container. Then, as the end of the label is withdrawn from the magazine, the lap paste is applied directly to the label.

Continuing, the container passes between pressure rolls, where the wide sides are rolled tight. Another 90 deg. turn is then made, and the narrow ends and over-lap are laid down. The container then leaves the machine and passes into the discharge conveyor.

The machine shown was specifically developed for the tapered can used for corned beef, but it is similar in appearance to the machine for fiber-body, metal-end containers for frozen foods.—*Luthi Machinery & Engineering Co., 18004 S. Western Ave., Gardena, Calif.*



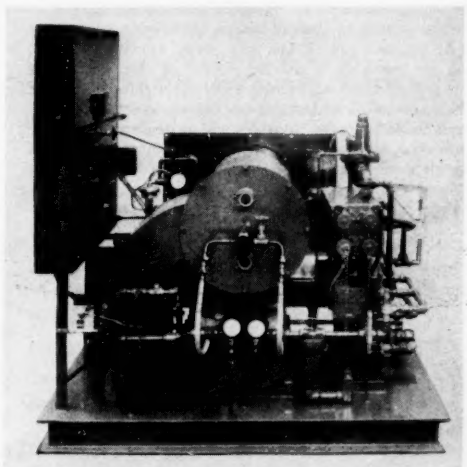
Flared Tube Fittings

Produced in Type 316 stainless steel, "Koncentrik" flared tube fittings are designed primarily for use in lines carrying highly corrosive liquids and gases, or where operating shock and pressures are excessive.

Engineered for maximum protection against leaks due to coupling failure, a patented floating seat, that automatically adjusts itself to the tube flare, insures true concentricity and full-circle, metal-to-metal contact because seat is wedged in position as tube nut is tightened.

Resilient Teflon rings act as an extra safety seal. These plastic bands, that are impervious to acids, compress into all surface irregularities when the fitting is tightened.

Flared tube fittings are also available in Carpenter No. 20 Stainless. Unions, couplings, tees, and elbows for line sizes to 1 in. are standard, with larger sizes special.—*The Special Screw Products Co., Bedford, Ohio.*

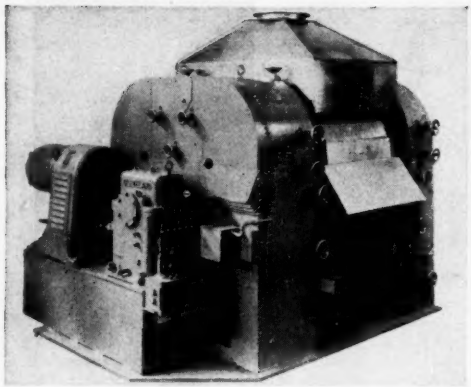


Packaged Automatic Burners

Designed to fire boilers at capacities of 100 developed hp. and upward, new automatic burner is a completely self-contained, packaged combustion system.

Available for both automatic and semi-automatic control, burner incorporates complete system of fuel-oil pumping and oil preheating equipment, also forced-draft blower and wide-range constant-differential mechanical-atomizing oil burner, all mounted on a compact steel base ready to be bolted to boiler front. Only requirement in installation is connection of service lines.—*Peabody Engineering Corp., 580 Fifth Ave., New York 19.*

(Food Equipment Continued)



Atmospheric Drum Dryer and Flaker

Designed for pilot plant use in food and chemical processing plants and in laboratories is new Model 214-A face dryer.

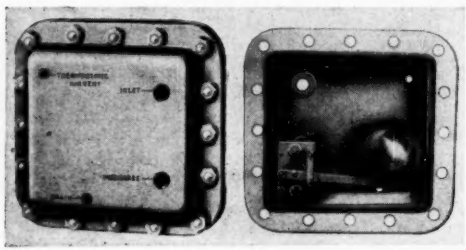
Measuring 2 ft. in dia. by 2 ft., this extremely flexible unit can be used as a double drum dryer or a double drum flaker, or as a single drum dryer or flaker by merely separating the drums and rotating only one.

It can also be used as a twin drum dryer or flaker by rotating drums in opposite directions and feeding from below. Complete instrumentation permits exact recording of data and control of all variables while making tests.

Furnished with two sets of drums, stamped in accordance with ASME code for 160 psi. max. steam working pressure, drums are available in a wide variety of metals. Drums can be either heated with steam or by other suitable heating mediums, or cooled with water for flaking or chilling.

Drum drive has a 24:1 speed range, with drive reversible for use with all types of feeds. Drums can be separated for single drum operation through controllable wrenches on outside of end frames.

Instruments clearly indicate drum clearances in thousandths of an inch. An automatic mechanism instantly increases clearance between drums, to prevent surface damage from entry of hard lumps or foreign objects.—*F. J. Stokes Machine Co., 5976 Tabor Road, Phila. 20, Pa.*



Continuous Drain Trap

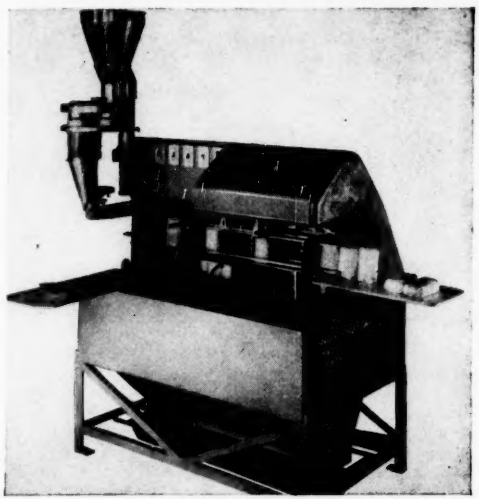
Affording means for instant removal of large quantities of water, oil, dirt and other condensates from steam, gas and compressed air lines, a steady, continuous, uniform flow trap has been developed.

This large capacity trap is easily incorporated into air or fuel separators, line purifiers, gas accumulators, process tanks, pipe lines and other steam storing or conditioning equipment which depends on rapid, complete drainage of condensate or foreign matter. The steam, gas or air condensate mixture enters the trap above the condensate.

A slide valve and float mechanism regulates flow of condensate according to the volume of condensate accumulation in the trap. The outlet valve seals tightly when there is no condensation taking place, thereby preventing unnecessary steam and heat losses.

Condensate or foreign matter is easily removed from the trap by merely moving the drainage lever on the cover, in which case the valve is held open and the trap is blown clean by steam, gas or air pressure.

Movement of the slide valve vertically over the orifice with the rising or lowering of the float, helps prevent short-circuiting of vapor, while the cutting action of the slide continuously frees the valve orifice of sludge or other foreign matter in the line. Trap is manufactured in screwed or flanged types for ½ in., ¾ in. and 1 in. pipe sizes, and for pressures of 150 psi. and 300 psi. and temperatures up to 750 deg. F.—*W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn.*



Semi-Automatic Bag Machine

Ability to handle a variety of products—beans, peas, lentils, macaroni, coffee, shredded coconut, cookies and many others—is a feature of a new semi-automatic bag machine.

It will handle bags of any heat sealing material, such as heat sealing cellophane, foil, Pliofilm, or thermo-plastic coated paper.

Floor space required is roughly 15 sq. ft. The machine requires one operator to open the bags, hold them on the spout of the filler, and then set them into position in the machine. From this position, they are taken forward entirely automatically and vibrated, and the folds and seals made. An additional girl is required to pack the finished packages into cases.

Unit has a variable speed geared head motor and is set to run between 20 and 40 complete packages per min. Rate of speed depends on operator's ability to handle bags.

Minimum bag size is 1 x 2 x 5 in. and the maximum bag size is 3 x 6 x 12 in. Machine is quickly adjustable.—*Niagara Packaging Machinery Corp., 1208 Military Road, Buffalo 17, N. Y.*

(Food Equipment Continued)

He's got the WORDS...We have the FACTS!

WEST TERAMINE...

the powerful all-purpose germ-killer
for the FOOD INDUSTRY

Laboratory-Perfected

FOR EVERY FOOD INDUSTRY

MILK • BUTTER • CREAM • ICE CREAM • CHEESE
SUGAR • EGGS • FISH • MEAT PRODUCTS
POULTRY • FROZEN FRUITS and VEGETABLES
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PROCESSING EQUIPMENT • PACKING EQUIPMENT • REFRIGERATORS • TANKS • STORAGE BINS • FREEZING UNITS • TRUCKS • CONVEYORS
WALLS • FLOORS • WASHROOMS, etc.

Yes, without exaggeration, here's the many-in-one germ-killer you've been looking for! A quaternary ammonium compound that does most every cleaning job *better* and *faster*. West Teramine thoroughly sanitizes, cleans and disinfects all kinds of food equipment *without leaving an ODOR*. Does the same for walls, surfaces, floors and washrooms. Kills bacteria, molds and fungi *everywhere*.

IT'S "SURFACE-ACTIVE"

West Teramine is more powerful—has extra penetrating power because it's faster-wetting and "surface-active." More versatile—a slight change of dilution adapts it to any need. More economical—a little goes a very long way. In recommended dilutions, West Teramine is non-poisonous, tasteless, and won't irritate the skin.

PROVE IT FOR YOURSELF!

See Teramine in action! Learn why the entire food industry is sold on it. You'll be sold *too* after one demonstration.

Other WEST Products that Promote Better Food Industry Sanitation:

LIQUID SOAPS AND DISPENSERS • FLOOR MAINTENANCE • PROTECTIVE CREAMS AND PROTECTIVE APRONS • INSECTICIDES AND INSECTICIDAL EQUIPMENT • WASHROOM SANITATION • KOTEX VENDING MACHINES • and others.

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☐ Please send me a free sample of Teramine—*plus* booklet!
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Company_____
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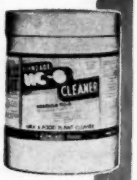
COMPLETE PROGRAM

For Food Plant Sanitation

Save pay-roll hours by streamlining your clean-up operations and using more effective lower-cost-per-job cleaners, detergents, and bactericides. Eliminate waste materials and unnecessary effort. A Klenzade field technician will help you plan a complete integrated program.

KLENZADE HC-6 Cleaner



Scientifically balanced high-efficiency soapless cleaner. Contains wetting agents and special polyphosphates for general cleaning. Softens hardest water.

STER-KLEEN KLENZADE LC-112

Fast-working organic acid detergent compatible with all quaternaries. Removes lime film on stainless steel, glass, tables, etc.

STER-BAC KLENZADE S-12

Outstanding powerful quaternary. Sustained bactericidal action. For deodorizing and disinfecting in food plants.

44 Branch Offices and Warehouses

Write us about Klenzade Field Technical Services and plant cleaning programs. No obligation.

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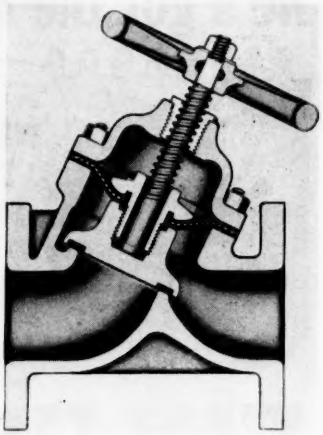


Diaphragm Valves

Utilized in new line of diaphragm valves is a design principle that limits the diaphragm function to sealing the bonnet. The valves are recommended for use with compressed air, compressed and liquefied gases, corrosive and noxious gases, and for many corrosive fluids, solvents, and waters.

A separate seating member, giving positive control of flow independently of the diaphragm, reduces the flexing to which the diaphragm is subjected and eliminates the crushing action.

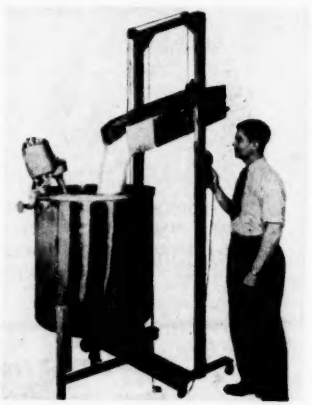
Shut-off of flow is positive at all times. Even in event of diaphragm failure, fluid cannot pass on to line when valve is closed. Quicker closing is also a feature. Y-pattern body design gives greater flow capacity.

Two types of valves are available—one plain iron and the other neoprene lined and coated. Both have bolted bonnets. Plain iron valves with screwed ends are offered in sizes ½ to 2 in., inclusive; and with flanged ends in sizes ½ to 4 in., inclusive. The neoprene-lined valves are being made with flanged ends only, size—½ to 4 in.

In the unlined valve (right in photo) a newly designed flat-face disk with neoprene insert is used to assure tight seating. The neoprene model valves do not have such an insert, for their entire disk surface is heavily faced with neoprene, which makes a seal with the covered seat when the valve is closed.—*Crane Co., 836 S. Michigan Ave., Chicago 5.*

Pyrometer Controller

Development of a proportional current-input electronic pyrometer controller has been announced recently. New instrument proportions current input to electrically-heated furnaces, ovens, salt pots, and similar equipment, to provide practically straight-line temperature control. It does this by time modulation of input energy. Average energy supplied is proportional to deviation of temperature from control point throughout a band width adjustable from 0 to 2½ percent of full scale reading.—*Bristol Co., 150 Bristol Rd., Waterbury 91, Conn.*



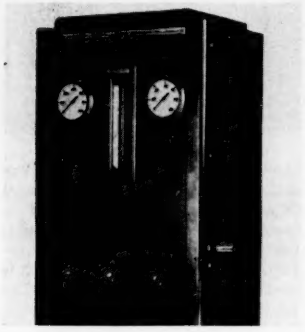
Portable Skip Hoist

Designed for dumping bags of free flowing materials, the "Upanover" portable skip-hoist dumps from 3 to 12 ft. (stationary models dump at up to 25 or 30 ft.). Dumping height is adjustable, and angle can be easily changed.

Rubber cleats keep a firm grip on either paper or cloth bags while they dump from the tapered open skip. Standard ⅓ hp. single phase 110/220v.

motor lifts up to 150 lb. Substitution of ½ hp. motor on same machine lifts up to 250 lb.

Floor space occupied is 21 in. x 34 in. Skips can be of stainless steel for food industries.—*Jacob House & Sons, 52–54 St. Paul St., Buffalo 8, N. Y.*



Chlorine Dispenser

Safety, accuracy, economy, and mechanical simplicity are some of the features reported for the new "Rato-Chlor" chlorine dispenser.

Based on the modern science of instrumentation, the dispenser is assembled from standard components, each of which is particularly designed for chlorine service. It is a "dry vacuum" chlorine dispenser which uses no water seals, bell jars, or poppets.

Chlorine from cylinder, drum or tankcar is filtered first to remove gum-forming hydrocarbon impurities that might be present to deposit "taffy" in working parts. It is then delivered to unit at a controlled pressure.

Flow rate is set by adjusting a packless, needle-type regulating valve and is measured accurately by a Flowrator meter calibrated to indicate pounds per day of chlorine vapor. A differential-pressure regulating valve completes the flow control element that maintains preset rate of flow.

Vacuum is created by an efficiently designed ejector and kept uniform by a vacuum regulating valve. Ejector also mixes a dilute chlorine-water solution, which it discharges through a distributor into stream being chlorinated.

Meter can be equipped with recording or totalizing accessories to produce a continuous record of chlorine consumption and to eliminate use of chlorine scales.

Dispensers are produced in 17 standard sizes ranging from a min. cap. of 10 lb./day to a max. capacity of 7500 lb./day.—*Fischer & Porter Co., Hatboro, Pa.*

(Food Equipment Continued)

STEEL

Every Kind
Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

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Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

Really Portable!

Cut your costs this EASY way! Why pay for wasteful old-fashioned "brute-strength" methods when the NEW Gee-Vee-Line Conveyors are so economical! Make them standard equipment and watch YOUR Materials Handling costs . . . go down! It's worth it!

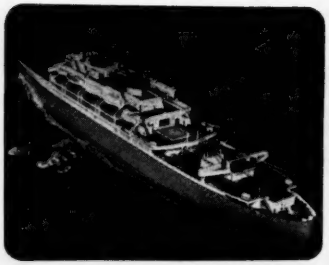
WEIGH ONLY 26 POUNDS

Designed to meet the demand for flexibility-in-use as a materials handling aid . . . indoors, outdoors, on assembly line or delivery line . . . in factory, warehouse, store or trucking fleet. No need to pamper them—they're tough and practically maintenance proof. Standard 10-foot sections WEIGH ONLY 26 POUNDS and

HANDLE UP TO 150 POUNDS

Available in five- and ten-foot straight sections and 90-degree curve sections, all with built-in couplers. 5 sizes of tripod supports. Immediate shipment. Write for details today.

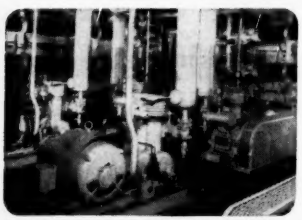
HASLETT CHUTE AND CONVEYOR CO., Oaks, Pa.



Another "President" Liner Equipped with Frick Refrigeration

The S. S. "President Wilson," 23,500-ton, 610-foot sister ship of the "President Cleveland," also carries nine Frick refrigerating machines. These cool 10 food storage rooms, galley box, ice-making tank, and 13 refrigerated cargo holds.

Whether you operate a luxury liner or a tug, a factory or a theatre, an ice plant or a laboratory, you can do it better—

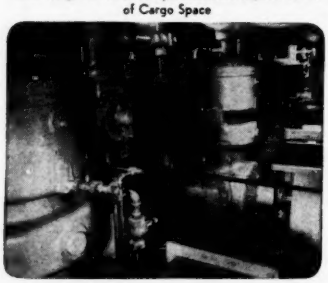


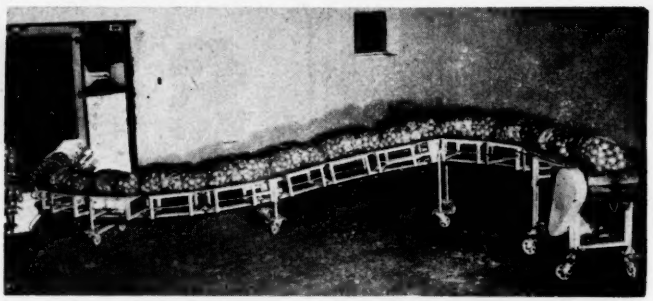
Six Frick Units are Used on Each of These "American President" Liners

give better service and earn better profits —with the aid of Frick refrigerating, ice-making, or air conditioning equipment. In writing for literature and estimates, please describe the cooling work you want to do.

FRICK CO. WAYNESBORO, PENNA.

Three Large Freon-12 Compressors Cool 55,000 Cu. Ft. of Cargo Space



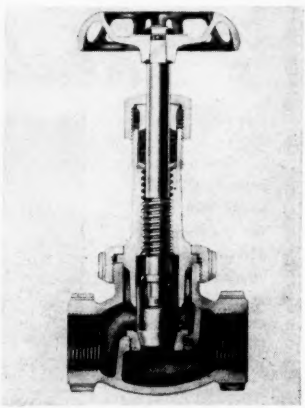


Flexible Conveyor

Leading feature of new conveyor is its flexibility for carrying boxes, crates, sacks, and barrels through a boxcar door and to the end of the car. It can be curved into more than 90-deg. turns, and it affords flexibility horizontally and vertically at the same time.

Motion is reversible for loading and unloading operations, without need of the unit being moved. A 2-hp. motor is furnished.

Available in 20 to 40-ft lengths, the conveyor operates on the continuous-track principle. Standard, 2-ft. extra sections can be added for any length. —*H. W. Creager Mfg. Co., Arvada, Colo.*



Plug-Type Valve

New plug-type bronze globe valve is described as suitable for severe services, such as in pressure regulation, in steam control by-pass lines, for temperature regulation, apparatus throttling, bleeds, drips and drains, soot blowers, continuous blow downs, or any other close regulation of steam.

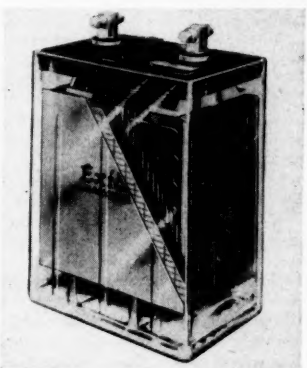
Valve is listed for 300 lb. service. One of its features is the "Armor Seat" and slip-on, stay-on plug. Plug and seat ring of JX500—a special alloy stainless steel, heat treated to give proper hardness (500 Brinnell). plus extraordinary ductility—is reported to make a combination which is practically impervious to wear. The new plug is simple in design, with T-slot for engaging spindle head.

Another advantage noted is design of spindle, made of hard, tough aluminum bronze, a new corrosion resistant alloy.

Liberal dimensions of body, bonnet, and bonnet ring provide ruggedness to stand rough usage and to contain pressures beyond those rated.

A deeper stuffing box holds more packing, prevents leakage, and is stated to assure friction-free spindle operation. V-shaped lugs on union bonnet ring and body ends permit use of any type wrench.

Valve is available in sizes ¼ to 2 in.—*Jenkins Bros., 80 White St., New York City.*



Glass-Jar Storage Battery

Stated to embody a number of improvements, new storage battery known as Exide-Manchex is of sealed-glass-jar type. It is applicable to all types of stationary power in electric

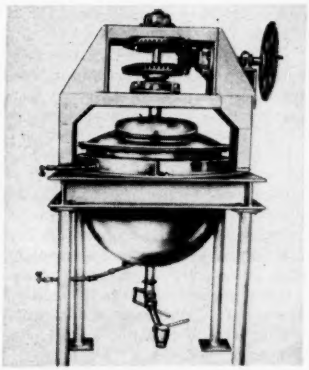
utilities, telephone, emergency power and lighting, and other general applications where exceptional long battery life is desired.

Features reported are low maintenance cost, improved electrical characteristics, increased power output per unit of space, less weight per amp. hr. output, and attractiveness of appearance.

Special positive plate, known as Manchester type, consists of a grid cast of a lead antimony alloy in which active material is in form of pure lead buttons. These buttons are forced by hydraulic pressure into circular openings in grid.

The "Permanized" negative plate is constructed of a lead antimony grid or framework with a series of vertical ribs connected by short horizontal bars.

Battery is available in a wide variety of sizes and capacities, from 40 to 960 amp./hr.—*The Electric Storage Battery Co., 19th St. and Allegheny Ave., Philadelphia 32.*



Jacketed Mixer

For use in mixing pastes, glue, adhesives and other heavy or thick materials, new polished stainless steel mixer is designed for operation at atmospheric pressure with 15 psi. steam or hot water in the jacket.

The U-type agitator, which simultaneously stirs and removes the material from the sides and bottom of the kettle, assures uniform, rapid heating and mixing without burning or caking. The agitator is driven through the gear mechanism by a chain and motor.

Flush-bolted to top of the kettle, a water-tight cover is fitted with a swing-bolted manhole, a thermometer well, and two "blow-out" pipe openings. A water gage with stainless steel fittings is located on the jacket.

Run off of the working mixture is

(Food Equipment Continued)

In-Plant Chlorination **Stretches** Production Hours

Faced with rising costs all along the line, smart food plant operators are looking for ways to increase production efficiency while maintaining or increasing product quality. That's why we think you'll be interested in what In-Plant Break-Point Chlorination is doing in progressive plants throughout the country—in what it *can* do in yours.

Briefly the story is this: In-Plant Chlorination cuts clean-up time as much as 50% by preventing slime accumulations due to bacteria in flumes, washers, pipes and other equipment. It makes the clean-up job easier because of the effective sterilizing action of a free chlorine residual which maintains a greater degree of cleanliness throughout production time. And it protects product quality by eliminating bacteria-induced off odors and flavors.

The complete story is yours for the asking. Why not write today? There's no obligation, and W&T Engineers will be glad to show you how job-engineered, W&T Chlorination backed by over 35 years' experience can help you put more production in each working day.

I-20

WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

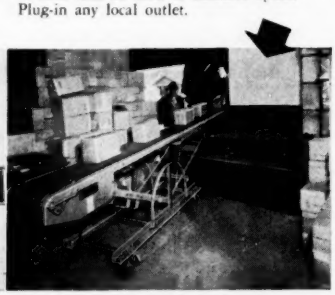
NEEDLESS HANDLING

Here's 3 ways to stop it!

SYSTEM For volume movements of manufactured parts, packaged items, tote pans, etc., use a complete conveyor system. Standard Conveyor Systems can be designed to meet your individual needs . . . with belts, wheels, rollers or chutes complete or in combinations as needed. You can conveyorize a department or a complete plant from raw stock receiving to final shipping.

SECTION If your problem is handling parts or packages within a department, you can buy small sections of roller or wheel conveyors that are easily transported and set up where needed. This is ideal for loading docks, warehouses, shipping platforms and stock rooms. Saves time and labor, minimizes damage from excess and rough handling. Use gravity for power.

UNIT Portable powered units, like the Standard Handi-Belt shown here are a real time and labor saver. They handle boxes, bags, cases and small bales with equal facility. Reversible power drive permits higher stacking and handling in warehouses. Makes for faster unloading and loading in trucks or cars. Can be used in confined space. Plug-in any local outlet.



For detailed information on any one or all three, write for Standard's Catalog. See how conveyors can be used in your business. Ask for Bulletin No. FI-49.

STANDARD CONVEYOR COMPANY

General Offices: North St. Paul 9, Minn. • *Sales and Service in Principal Cities*

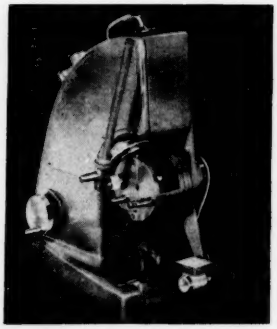
FREE HELPFUL LITERATURE

Send for Standard's Catalog. See how conveyors are used in every field of industry. Ask for Bulletin No. MI-88

Standard GRAVITY & POWER CONVEYORS

Food Equipment News

regulated by means of flush-type stainless steel plug valve and sanitary valve arrangement mounted in bottom of kettle.—*L. O. Koven & Brother, Inc., 154 Ogden Ave., Jersey City 7.*



Refractometer

For testing and controlling the quality of foods, chemicals and oils, a radically new refractometer is now being produced.

The portable, electrically illuminating instrument affords accurate refractive index readings in less time than was possible with previous instruments, states maker.

Its prism system may be removed by the user and replaced quickly with a duplicate set to avoid layoffs, should repairs become necessary. It is stated that previous models required factory servicing, involving several weeks delay when necessary to recondition prisms.

Other features include a built-in, corrosion-free glass scale, a dust-proof housing and illumination system, and stationary eyepieces.

The new instrument is seen aiding industry in improving product quality.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.*

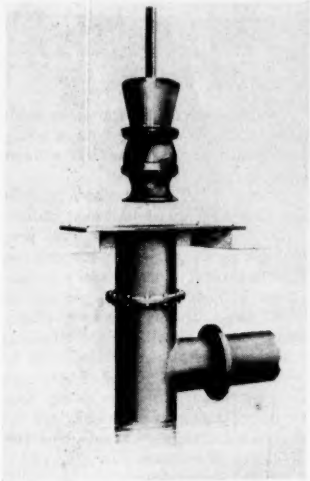
Parts and Fittings Dolly

To help food processors save time and do a more effective job washing sanitary fittings and equipment parts,

a new stainless steel parts and fittings dolly is now offered.

Its large capacity—24 x 48 x 30 in.—reduces the number of trips to the wash sink. Sloping trays of No. 12 gage stainless steel will not get battered out of shape by heavy loads of fittings and parts.

Two wheel brakes permit positioning on floors that have slopes to drains. The frame is of all-welded stainless steel tubing, with welds ground and polished. Trays are pitched for convenient draining to drain pipe at end of tray. The 5-in. casters will not bend, turn over, or rust tight.—*Engelke Engineering, Inc., Hartford, Wis.*



Axial Flow Pumps

Recommended for power plant condenser circulation and for other continuous operations—where it is desirable to disengage all working parts for periodic inspection without breaking pipe or mounting connections—is a new "Pull-Out" model in axial-flow and mixed-flow type pumps.

These units are so designed that all working parts are removable without breaking discharge connections. Suction bell, impeller, impeller housing, shaft, motor base, and motor can be removed without disturbing the column and discharge elbow. There is particular advantage when the discharge elbow is below floor level, or when the pit in which the pump is installed is not easily drained.

Supplied in either cast or welded construction, and of alloy materials if specified, pumps are available in sizes up to and including a capacity of 100,000 gpm.—*Economy Pumps, Inc., Hamilton, Ohio.*

(Food Equipment Continued)

$1,500 inventory abolished—at a cost of $4.46!

With more than 700 vacuum tubes needed by industry, a tube distributor would find profits consumed by 100% inventories. But by ordering tubes as needed via Air Express, he holds stocks to 25%. Example: Orders **$1,500** tube at 9 A.M. from supplier **900** miles away. Delivered to customer 6 P.M. same day. **16** lbs.: cost, **$4.46.**

Remember, $4.46 *included* speedy pick-up and delivery service, too. *More* protection, because you get a receipt for every shipment. Air Express is the *world's fastest* shipping service.

Your Air Express shipments go by the Scheduled Airlines direct to over 1,000 airport cities; fastest air-rail for 22,000 off-airline offices. Shipments *keep moving* with 'round-the-clock service.

FACTS on low Air Express rates

19 lbs. of machine parts goes **600** miles for **$3.54.**
9-lb. carton of new styles goes **1400** miles for **$3.99.**
(Every kind of business finds Air Express pays.)

Only Air Express gives you all these advantages: Special pick-up and delivery *at no extra cost. You get a receipt for every shipment* and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to $50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

SPECIFY AIR EXPRESS
AIR EXPRESS
GETS THERE FIRST

Rates include special pick-up and delivery door to door in principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE
SCHEDULED AIRLINES OF THE U. S.

SAVE TIME...SAVE MONEY...
get a quotation from--

Chicago Stainless

Designers and manufacturers of all types of storage, refrigerating, and processing equipment for the milk, food and chemical industries.

Three 300 gallon Chicago Stainless ice cream mix flavoring tanks.

EVERY UNIT CUSTOM BUILT
—at a competitive price

When you order equipment from Chicago Stainless you know it will be engineered to meet YOUR specifications . . . and . . . custom built to fill YOUR job requirements — without costing one dollar extra. You'll save time and money by getting a quotation from Chicago Stainless. No obligation. Write TODAY.

Here are just a few of the various types of equipment made by Chicago Stainless:

- Chemical Processing Tanks
- Food Processing Tanks
- Refrigerating Tanks
- Storage Tanks
- Reaction Kettles
- Transportation Tanks
- Steam Jacketed Kettles

CHICAGO STAINLESS EQUIPMENT CORPORATION
2001 SLESTON AVENUE

Food Equipment

Small Milk Filter

Specifically intended for use in small milk plants, new milk filter can easily be installed in production line without separate pump or motor.

Designated as Model 8-M-3, filter is a complete, compact unit that utilizes a filtering area of 1 sq. ft., thus providing ample capacity for maintaining high flow rates under normal pipe-line pressure. Should pipe-line pressure be insufficient, however, an auxiliary pump can be installed ahead of filter.

Either filter paper or cloth can be used, and may be disposed of with each cleaning. All parts, including 1-in. sanitary tubing connections, are of easy-to-clean stainless steel.—*Sparkler Mfg. Co., Mundelein, Ill.*

Double Seamer

Designed primarily for small and medium sized packers is new AMS #224 semi-automatic double seamer. This unit can be furnished with or without detachable cover feed, the former necessitating curled covers.

Powered by a 1½-hp. 1800 rpm. motor, it contains the four-round roller seaming head, the seaming levers being adjustable for entire range of machine.

In operation, foot treadle is tripped to engage a clutch to time baseplate cam with revolving seaming head. Actual baseplate lifting is done by machine, not by operator. Due to sturdy construction of seamer, there is said to be no vibration to contend with.

Unit will close cans from 2 in. dia. x 2 in. up to and including 6⅝ in. dia. x 11 in.

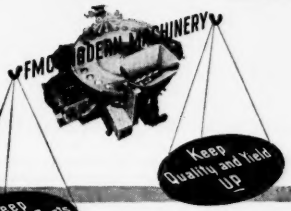
With automatic cover feed attachment, speed is approximately 45 cans per min., depending upon product, and dexterity of operator.—*The Max Ams Machine Co., Bridgeport 5, Conn.*

—*End*

a Filler for every product, container or size in the complete **FMC** filling machine line

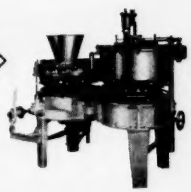
NEW M&S 20-POCKET PLUNGER FILLER

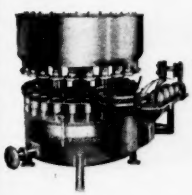
With 20 pockets and 20 pistons this brand new FMC Rotary-Type Machine will handle up to 450 cans per minute. Adaptable for baby foods, apple sauce, chocolate syrup, oil and many other products.



Keep Processing Costs DOWN

NEW FMC 15-STATION FILLER
for Peas, Whole Grain Corn, etc. Many new features.





FMC 24-VALVE JUICE FILLER
A high-speed filler for Tomato Juice, Citrus Juices or any free-flowing liquid.

- **PULP FILLERS**
  - No. 60 . . . 6-valve
  - No. 100 . . . 12-valve
- **JUICE FILLERS**
  - No. 60 . . . 6-valve
  - No. 80 . . . 10-valve
  - No. 100 . . . 12-valve
  - No. 120 . . . 12-valve
  - No. 180 . . . 18-valve
  - No. 240 . . . 24-valve
- **BOTTOM FILLING JUICE FILLERS**
  - No. 60 . . . 6-valve
  - No. 80 . . . 10-valve
  - No. 100 . . . 12-valve
  - No. 120 . . . 12-valve
  - No. 180 . . . 18-valve
- **LIQUID FILLERS**
  - No. 60 . . . 6-valve
  - No. 80 . . . 10-valve
  - No. 100 . . . 12-valve
  - No. 120 . . . 12-valve
  - No. 180 . . . 18-valve
- **SYRUPERS AND BRINERS**
  - No. 60 . . . 6-valve
  - No. 80 . . . 10-valve
  - No. 100 . . . 12-valve
  - No. 120 . . . 12-valve
  - No. 180 . . . 18-valve
- **FMC SOUP FILLERS**
  - 6 Station
  - 10 Station
  - 12 Station
- **SINGLE VALVE JUICE FILLER**
- **HAND PACK FILLER**
  - Plain or Automatic Hopper
- **M & S PLUNGER FILLERS**
  - 6, 9, 10 and 20 Pocket Sizes
- **M & S COOKER FILLERS**
  - 6 and 10 Pocket Sizes
- **FMC SPECIAL FILLERS**
- **FMC-HANSEN 8 STATION FILLER**
- **FMC 15 STATION FILLER**

Even this long list does not begin to tell you all the different kinds and sizes of Filling Machines that FMC builds. If you have a special filling problem—something unusual, difficult or "tricky"—put it up to FMC. Our group of filling specialists will probably find we have the very thing for your purpose. But if we haven't a machine in our line that exactly meets your requirements, we'll adapt one of our standard machines or design a special filler for you.

Send for the latest FMC Catalog of Processing, Canning and Packing Equipment for Corn, Peas, Beans, Tomatoes and all Vegetables and Fruits. It's Free.

FOOD MACHINERY AND CHEMICAL CORPORATION

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The Best for BIGGER Value

GMCs are available in models and types, engines and wheelbases, chassis and equipment options to provide exactly the right truck for every food transport need.

Because of the outstanding engineering, testing and manufacturing facilities of the world's largest exclusive producer of commercial vehicles.

Because of a nationwide network of specially equipped and expertly manned factory-operated branches and dealer service stations.

Because of a new and extensive parts warehousing program assuring fast, flexible distribution of GMC parts to every section of the country.

Because of products that are truck-built throughout . . . providing engines and chassis that are famous for long-life, low-cost operation.

GMC TRUCKS
The Key to Greater Truck Value
GASOLINE · DIESEL

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

Catalogs, Bulletins

Food Plant Equipment

Feed Control

Equipment to regulate materials fed to "Jay Bee" hammer mills is described and illustrated in Bulletin 149-2, titled "Constant Feed Control".—*J. B. Sedberry, Inc., Franklin, Tenn., and Tyler, Tex.*

Wrapping Machines

Cellophane-wrapping machinery is illustrated and described in 4-page brochure. Labeling and imprinting machines are also delineated in the folder.—*Package Machinery Co., Springfield 7, Mass.*

Container Closures

Automatic stitchers are pictured and described in pocket-size brochure. Performance features and standard specifications are covered for various models.—*Inland Wire Products Co., 3947 S. Lowe Ave., Chicago 9.*

Flat Spray Nozzles

For service where water or liquid chemicals are used in cleaning, cooling, washing, and descaling operations, new flat spray nozzles are covered in Bulletin 48-38. Tabular information concerning their discharge in gal. per min., dimensions, materials and sizes is given. —*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

Vertical Mixers

Advantages, specifications and construction details of new Model "VA" vertical mixers are presented in 4-page color Bulletin VA-948. Units are normally furnished with vertical motors and top V-belt drives in 50, 100 and 150 cu. ft. capacities.—*Sprout, Waldron & Co., Muncy, Pa.*

Wire Belts

Uses of chain link, flat wire and flex-grid belts are detailed in 4-page foldout. Belt widths, wire gage, and mesh are covered.—*Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.*

Carton Marker

For conveyor line use, a marker which automatically dates, codes, or marks production runs of cartons and packages, and is readily adaptable to present conveyor lines, is featured in 4-page booklet.—*Industrial Marking Equipment Co., Div. of National Rubber Stamp Works, Inc., 7 E. 48th St., New York City 17.*

Heat Exchangers

Design and service of four types of heat exchangers using "Karbate" as protection against corrosive fluids and gases are related in a brochure titled, "Karbate Heat Exchangers". Included are data on physical properties of "Karbate", and also a table giving its resistance to a large number of acids, salt solutions, alkalis, organic compounds, and gases and mixtures.—*Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.*

Packaged Steam Generators

A complete description of the operating principles and design characteristics of automatic steam generators is given in Bulletin P-1. Included are diagrammatic sketches of the combustion operating principle, automatic firing sequence, electronic controls, flame characteristics, construction details, performance data, and standard ratings for both steam and hot water generators in sizes from 10 to 300 hp. —*Cyclotherm Corp., 90 Broad St., New York 4, N. Y.*

Chlorine Dispenser

Equipment for dispensing chlorine is delineated in 12-page catalog, Sec. 61, Pub. 10035. Diagrammatic layouts of fully automatic dispensing units are shown. Component parts, such as filter, pressure gage, automatic shut-off valve, ejector, vacuum regulator and evaporators, are also illustrated.—*Fischer & Porter Co., Hatboro, Pa.*

Jar Cooler and Pasteurizer

Equipment designed to pasteurize, hold, and cool products packed in jars, bottles and cans is subject of new Bulletin JC-1. Colored sectional view shows operating zones.—*Island Equipment Corp., 27-01 Bridge Plaza N., Long Island City 1, N. Y.*

Butter Printers

Machinery for printing and wrapping butter in various designs and sizes is described in 16-page color bulletin.—*C. Doering & Son, Inc., 1375 West Lake St., Chicago 7.*

Speed Reducers

Installations of air cooled worm gear reducers in various types of plants are pictured and savings expressed in dollars are described, in bulletin, "More Horsepower Per Dollar".—*The Cleveland Worm & Gear Co., 3293 E. 80th St., Cleveland 4.*

Glass Pipe Lines

Installations of glass pipe in various food processing lines are illustrated in two-color photos and their use described in Bulletin EA-1, "Glass Pipe in the Process Industries." —*Corning Glass Works, Corning, N. Y.*

Wire Cloth and Screen

Up-to-the-minute information about wire cloth and screen, standard weights, gross list prices, etc., are contained in new 80-page Catalog, "Cambridge Wire Cloth and Metallic Screen".—*The Cambridge Wire Cloth Co., Cambridge, Md.*

Automatic Bottle Packer

How bottles are automatically packed in trays or cases by Model 830-A Bottle Packer is described in 4-page bulletin. Engineering drawings show layout and dimensions of equipment. Operating advantages, capacities and maintenance information are given.—*Standard-Knapp Corp., Portland, Conn.*

Bread Wrapper Printer

Concisely presented in a two-color leaflet, DM-503, are description, photos, features and specifications of new paper registration device, latest feature for AMF standard bread wrapping machine. Leaflet pictures "new look" in bread packaging, achieved with device.—*Bakery Div., American Machine & Foundry Co., 485 Fifth Ave., New York 17, N. Y.*

Steel Tubing

Methods of economically protecting food-product quality—by preventing contamination caused by corrosion, erosion, chemical reaction, or improper sanitation in processing equipment where tubing is used—is contained in Bulletin TA-1398. It presents grades, sizes, and finishes of tubing developed for applications such as process piping, evaporating and condensing equipment, heat exchangers, precoolers, pasteurizing and sterilizing equipment, dairy equipment, transfer lines, and other related uses.—*The Babcock & Wilcox Tube Co., Beaver Falls, Pa.*

Stainless Steel Coolers

Direct ammonia various-capacity tube coolers are illustrated in "Compact Coolers", two-color, 16-page Bulletin 180. Applications in dairy industry are covered. Installations of wort coolers in breweries are also included.—*Mojonnier Bros. Co., 4501 W. Ohio St., Chicago 44.*

Steam Separators

Descriptive data in new catalog covers 29 different types of steam separators furnished in a total of more than 145 sizes in pipe size range of ¼ in. to 16 in. Charts, tables and diagrams provide information for selecting type and size of separator needed. Included are descriptions of exhaust heads of several different types.—*Wright-Austin Co., 315 West Woodbridge St., Detroit 26.*

Packaged Steam Boilers

Operating and construction features of packaged steam boilers, ranging from 2 to 50 hp., are contained in 6-page bulletin. Component parts are described, and size, weight, and dimensions are given in table form.—*Alert Engineering Products Co., 315 W. Woodbridge St., Detroit 26.*

Canning Machinery

Various units of canning machinery, such as a flotation corn washer, sewage separator, pea washer, shaker rinser and corn silker, comprise subject matter in three-color 12-page bulletin, "Wisconsin Canning Machinery." Complete specifications are given.—*Sheboygan Machine Co., Sheboygan, Wis.*

Materials Handling

Electric Hoists

Action illustrations of electric hoists, also cross-sectional views, are included in 6-page folder, DH-65. Specifications of hoists are given.—*The Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.*

Power-Driven Curve Conveyor

Data on the "Streamliner", a power-driven roller curve conveyor, is contained in 1-page circular. Roller sizes, degree of curvature, and motor specifications are included.—*Harry J. Ferguson Co., 149 West Ave., Jenkintown, Pa.*

Industrial Trucks

Known as the "Case History" issue, the current Clark house organ, Material Handling News, presents detailed analyses of modern mechanized handling methods in industries of many kinds. Actual operations and benefits derived are detailed.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Chain and Cable Hoists

Principal products manufactured by American Chain & Cable's 13 divisions and 7 associate companies are listed in three-color, 20-page booklet, DH-509. Conveniently indexed alphabetical arrangement of book is a feature. Each heading has an illustration of a principal product.—*American Chain & Cable Co., Inc., Bridgeport 2, Conn.*

(Catalogs, Bulletins Continued)

Farquhar Conveyors *load direct from production line . . . eliminate all bottlenecks for* Champlain Valley Fruit Co.

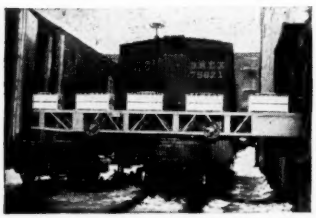
THE Champlain Valley Fruit Co. of Burlington and Rutland, Vt., handles packages, boxes, bags, faster and cheaper with Farquhar Conveyors. T. G. Lumra, vice-president, says: ". . . Farquhar is the answer to handling *consumer-size* packages . . . eliminates bottlenecks at trucks, and the conveyors may be *reversed* to pick up incoming loads in addition to regular production line loading."

With Farquhar Conveyors on the job packaged fruit is handled only once . . . moves directly from the production line right into the trucks . . . saves manpower and time. Farquhar Package Conveyors handle packages quickly and easily, offering maximum flexibility for all types of packing jobs. Champlain's overhead has been cut to the bone.

Hundreds of similar stories from laundries, food processors, grain and feed mills, chemical and paper plants, coal yards, contractors, warehouses, *echo more man-hours saved . . . handling is speeded up . . . over-all costs reduced* with Farquhar Conveyors.

Whether you stack, pile, load, unload or move materials from floor to floor . . . whether it's bags, bales, boxes, cartons, bundles, *any* kind of packaged or bulk materials—Farquhar has the right materials handling conveyor to do your job *faster, better, cheaper.* Tell us your handling problem; we'll give you the information you need.

Write for information to A. B. FARQUHAR CO., *Conveyor Division,* 205 Duke St., York, Pa., or 628 W. Elm St., Chicago 10, Ill.



Mounted on tracks inside building, this Farquhar counter-balanced Conveyor handles packages across railroad tracks in either direction: from trucks, cars . . . to storage or for reloading!

Farquhar
PORTABLE OR PERMANENT MATERIALS HANDLING
CONVEYORS

HYDRAULIC PRESSES · FARM EQUIPMENT · FOOD PROCESSING AND SPECIAL MACHINERY

Elevator Buckets

For handling free-flowing material at high capacity, a new "HS" high-speed elevator bucket is now offered. Descriptive matter is contained in Booklet 2299. Particulars on sizes available are given.—*Link Belt Co., 307 N. Michigan Ave., Chicago 1.*

All-Aluminum Conveyor

Features and advantages of an all-aluminum conveyor are contained in 4-page bulletin. Installations of equipment for various products are illustrated, and engineering data and specifications are given.—*Mercury Conveyor, Inc., Hillsdale, N. J.*

Steel-Belt Conveyors

Horizontal, inclined, and vertical steel-belt conveyors are depicted in 18-page bulletin. Engineering data and specifications on all component parts of conveyors are included. Stationary and portable units are covered.—*Steel-Parts Mfg. Co., Div. of Blackstone Mfg. Co., Inc., 4630 W. Harrison St., Chicago 44.*

Control Equipment

Indicating and Control Instruments

Complete line of Speedomax instruments, indicators, indicating recorders, and recording controllers, is covered in 44-page Catalog ND 46(1). Illustrations include close-ups showing design features; schematic diagrams of potentiometer and Wheatstone bridge circuit; and full-size, full-color sections of a round-chart and a strip-chart, with type of record available for each.—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44.*

Recordng Thermometer

Application of new "Series 500" recording thermometers to locker rooms, chill rooms, and quick freeze rooms is described in Bulletin T839.—*The Bristol Co., Waterbury 91, Conn.*

Filter Papers

New 36-page Catalog 70 presents, in diagram form, the relative retention values of analytical filter papers. Also considered are selection of most suitable grade of filter papers and physical characteristics of paper for laboratory use. Reference tables give data on filtrations in methods of inorganic chemical analysis.—*Carl Schleicher & Schuell Co., 116-118 West 14th St., New York City 11.*

Control Instruments

Indicating, recording, and temperature and pressure control instruments for canning industry are described in Catalog 1190A. Installations are shown in drawings, and equipment is illustrated with photographs.—*Portable Products Corp., C. J. Tagliabue Div., Park & Nostrand Aves., Brooklyn 5, N. Y.*

Dry Materials Meter

New Conveyoflo meter, for continuously weighing and totalizing the flow of dry materials on conveyor belts, is detailed in Bulletin E4 550. Unit can also be used for automatic proportioning and controlling of dry or liquid feeders for secondary ingredients.—*Builders-Providence, Inc., 66 Codding St., Providence, R. I.*

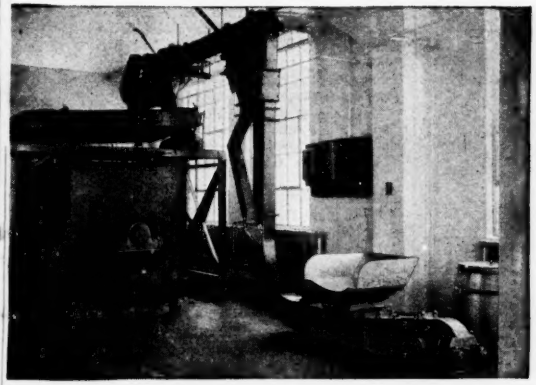
Plant Supplies

Water Conditioning Chemicals

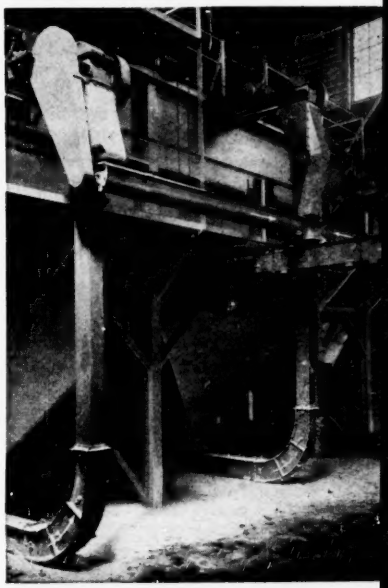
A new 8-page bulletin gives details on water conditioning, scale control and corrosion inhibition, and recommends chemicals for particular applications.—*Wright Chemical Corp., 627 West Lake St., Chicago 6.*

(Catalogs, Bulletins Continued)

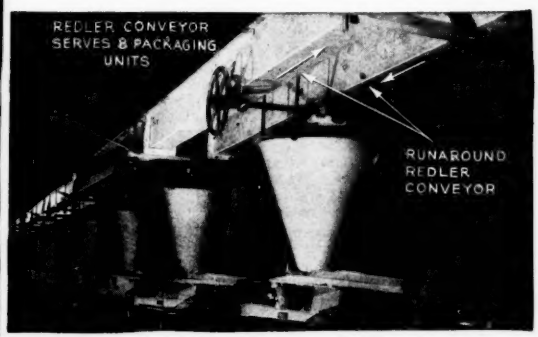
Stephens-Adamson REDLER Conveyors keep food products clean during handling...



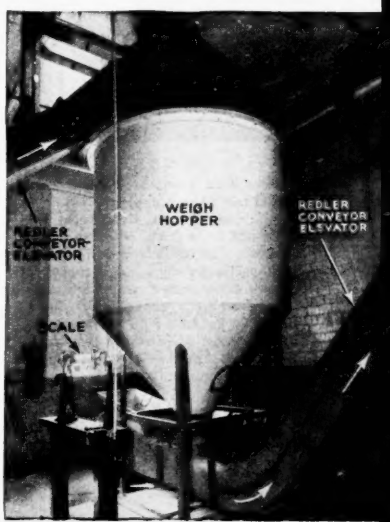
PROTECT PRODUCT PURITY—Preventing contamination is of prime importance in this modern food plant, where a Z-type REDLER conveyor-elevator handles pastry mixes. Sealed casings also prevent spillage. Compact REDLER design combines elevator and conveyor in one unit. Ingredients are fed into hopper at right, elevated and conveyed to sifting screen, and discharged into mixing machine. Write today for latest data on S-A conveyor systems for food products.



LIVESTOCK FEED is made of ingredients from three separate storage hoppers at this plant. Three L-type Redler conveyor-elevators carry materials to screw conveyor and horizontal Redler. No deep pits or troughs are needed to feed Redlers. Enclosed casings prevent spillage, keep foreign matters out. Write for suggestions on a compact, economical conveyor plan for your plant.



When absolute cleanliness without disturbance of balance of mixed ingredients is needed, S-A REDLER Conveyor-elevator Systems get the call. The system shown here conveys food ingredients, distributes the mixture to battery of packaging machines. Sealed casings prevent contamination, eliminate waste from spillage. S-A engineered REDLER Systems are in wide use in the food processing and chemical field . . . can be engineered to meet virtually any bulk material handling problem.



STUDY THIS REDLER SYSTEM. Here the upper REDLER Conveyor discharges into cylindrical scale hopper. Second REDLER Conveyor-elevator takes material to mixer units. Both REDLERS handle material from storage to mixing without exposure to contamination or spillage. Plant shown produces penicillin. Write us for full data on dust-tight, compact REDLER conveying and elevating systems.

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BULK MATERIAL HANDLING EQUIPMENT

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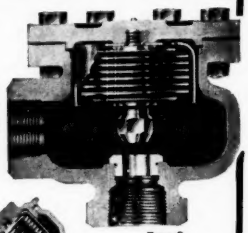
PRODUCTION INCREASES UP TO 30%

2 to 6 Times More Drainage Capacity Speeds Circulation

Plant records show that the greater drainage capacity of Nicholson thermostatic steam traps increases production up to 30%.

Other reasons why an increasing number of leading plants are standardizing on Nicholson: operate on lowest temperature differential, 5° to 15°, depending on trap size and steam pressure; record low for steam waste (as low as 1%). 5 types for every purpose; size ¼" to 2"; press. to 225 lb. BULLETIN 1047.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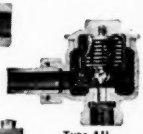
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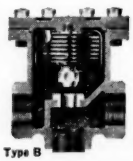
HIGH - PRESSURE FLOATS —Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery BULLETIN 348.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Type A

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

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More stuff handled with less effort and cost when your plant is equipped with Colson trucks. Hand trucks, barrel and drum trucks, platform trucks, dish trucks, Lift-Jack Systems, dollies, wheels and casters—all designed for ease of movement, floor saving, extra durability. Less "push" means popularity with workers, profits for you. Write us or consult your phone book for the local Colson office.

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Catalogs, Bulletins

Glues, Pastes and Gums

"How to Prepare and Use Glues, Pastes and Gums", a 20-page pocket-size booklet, contains data on storage temperatures, aging, opening of containers, thinning, mixing and other essential information on adhesives.—*National Adhesives, Div. of National Starch Products, Inc., 270 Madison Ave., New York City 16.*

Washing Compound

Developed to meet laboratory needs, "Chem-Brite," a new washing compound, is described in foldout.—*General Biochemicals, Inc., 10 Laboratory Park, Chagrin Falls, Ohio.*

Flour Treatment

"The Story Behind Oxylite", a pocket-size pamphlet, contains history and features of a brand of flour bleach. Information is also given on a flour enrichment mixture and a chlorinator.—*Winthrop-Stearns, Inc., 170 Varick St., New York City 13.*

Oven Chain Lubricators

Lubricators used for automatically applying lubricants (graphited) to conveyor chains on ovens, furnaces and driers are described in Bulletin 31. Complete information covering details of application and installation is included.—*Bel-Ray Co., Inc., Green Village Road, Madison, N. J.*

Miscellaneous

Motor Trucks

Complete specifications on power trucks are covered in "White Super Power Trucks", 12-page color bulletin. Motor details, also various component mechanical parts of the trucks, are illustrated.—*The White Motor Co., Cleveland 1.*

Protective Surfacing Material

For use in boilers and in power and processing equipment in wet-heat service, a protective surfacing material known as Apexior Number 1 is described in Bulletin 1530. The book provides application data, with information on special equipment for the internal coating of boiler, water wall, and economizer tubes.—*The Dampney Company of America, Hyde Park, Boston 36, Mass.*

Ice Cream Cabinets

Construction details and operating and space-saving features of a new model ice cream cabinet are given in 4-page pamphlet. Capacities are listed for various models.—*Frigidaire Div., General Motors Corp., Dayton 1, Ohio.*

Cleaning Machines

Industrial uses of wet and dry cleaning machines are presented in 4-page color brochure. Operation of various component parts of equipment are illustrated.—*The Kent Co., Inc., Rome, N. Y.*

Roof Coolers

Economies effected and operation and installation data on rotary roof coolers are presented in 6-page, color brochure.—*Siegfried Ruppright, P. O. Box 6795, Los Angeles 22.*

Grid Trays

Complete dimensions of eight different patterns of grid trays, also a safe load table and other engineering data to help in selection of suitable trays for individual services and requirements, are included in new Catalog G-48.—*Kerlow Steel Flooring Co., 220 Culver Ave., Jersey City 5, N. J.*

—End

How many sales in a square yard?

It all depends on how well your package is designed to use the space—be it floor, shelf, or counter.

Remember, cans are compact. They stack easily into eye-catching displays. They encourage impulse buying.

It's evident, therefore, that one of the most profitable ways of putting a square yard of store space to work for the retailer (*and for you*) is to pack your product in metal containers.

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This trademark is your assurance of quality containers. Look for it!

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FIVE OTHER WAYS CANS WORK FOR SALES AND PROFITS

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2. **Cans protect contents against light, air, insects, and moisture.**
3. **Cans are *light*—mean lower shipping costs.**
4. **Cans are tamper-proof.**
5. **Cans are easy to open and dispose of.**

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New Technology

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STORAGE

Storage of Frozen Foods

Fluctuating storage temperature does not affect the color, flavor, texture or nutritive value of frozen food, provided the temperature remains below 0 deg. F. Good packaging materials are necessary, however, to prevent desiccation, freezer burn, and quality deterioration in meats.

Experiments were conducted using snap beans, strawberries, ground beef and ground pork. Half of the meat samples were wrapped in good quality locker paper. The others were wrapped in laminated foil. Beans and strawberries were packed in paraffined, nesting-type containers. Duplicate samples were stored at 0 deg., and others at temperatures fluctuating between 0 and —10 deg. F. Temperatures were fluctuated through 3 cycles per week for 4 and 6 months.

There was a distinct falling off in quality of the meat wrapped in locker paper when temperatures were fluctuated. This was associated with considerable freezer burn and desiccation. No deterioration in flavor, and very little freezer burn, resulted in the foil-wrapped meats. In the case of strawberries, there was no significant difference in flavor, ascorbic acid retention, color, drainage and crushing strength between fluctuating and constant-temperature storage. There was likewise no difference in color, flavor and ascorbic acid retention in the case of snap beans.

Data covering flavor and appearance scores and loss of weight measurements for meats; average flavor scores for all products; and ascorbic acid retention in strawberries have been collated into tables.

Digest from "How Do Fluctuating Storage Temperatures Affect Frozen Foods?" by A. Hustrulid, J. D. Winter and Isabel Noble, *Refrigerating Engineering*, 38-41, Jan. 1949.

CEREAL PRODUCTS

Heat Treatment of Peanuts

That moderate heat treatment, either by moist heat or roasting, does not significantly alter the nutritive value of peanuts, was demonstrated by feeding tests using 80 albino rats. Overroasting has deleterious effects, however, and peanuts roasted to a dark brown color may be so impaired that their proteins are essentially worthless for growth. On diets of raw, boiled and roasted (320 deg. F.) peanuts, the average weight increments per g. of protein consumed were 1.74, 1.84 and 1.65 g., respectively. On peanuts roasted at 356 deg. F., however, the rats showed an average gain of only 0.21 g. per g. of protein consumed.

Roasting peanuts at 320 deg. F. is the most favorable processing method from the standpoint of vitamin retention. At this temperature, none of the riboflavin, and only ¼ of the pantothenic acid was lost. Boiling produced a loss of ¼ of both these vitamins, and roasting at 356 deg. F. destroyed ¼ the riboflavin and almost all the pantothenic acid.

Digest from "Effect of Heat Upon the Nutritive Values of Peanuts. I. Protein Quality," by L. W. Buss and V. R. Goddard, and "II. Riboflavin and Pantothenic Acid Content," by K. R. Dunn and V. R. Goddard, *Food Research*, 506-11, 512-17, Nov.-Dec. 1948.

Bleaching Agents in Flour

Improving agents other than nitrogen trichloride appear to be acceptable for the treatment of flour intended for human consumption. This was indicated by experiments in which dogs were fed diets with high levels of flours treated with ammonium persulphate, potassium bromate, chlorine, chlorine dioxide, and nitrogen trichloride. In order to increase the severity of the tests, heavier treatments were given the flours than those used commercially.

Six days a week, each dog was offered 100-200 g. of flour (steamed 90 min. before feeding) to which was added 5 percent yeast, 20g. skim milk powder, 10ml. corn oil, 2g. NaCl, 2g. liver concentrate powder and 15g. lean meat. In addition, 5ml. fish liver oil, 1mg. thiamine hydrochloride, 1mg. pyridine hydrochloride, 2mg. riboflavin, 10mg. niacinamide, 10g. calcium pantothenate and 100mg. choline chloride, were given each dog once weekly.

Without exception, dogs fed diets containing nitrogen trichloride-treated flour exhibited symptoms of running fits. No untoward symptoms were observed in the dogs fed diets containing flours treated with the other agents.

Digest from "Effect on Dogs of Flours Treated With Various Improving Agents," by A. Arnold, *Cereal Chemistry*, 46-51, Jan. 1949.

VITAMINS

Sunlight Improves Oranges

Vitamin C content of oranges from outside branches is significantly higher than in those from inside branches of the same tree. And percent total solids is also higher in the exposed fruit.

These conclusions resulted from investigations of 6 varieties of round oranges, Temple oranges and tangerines. In 44 lots of round oranges, regardless of variety, exposed fruits contained an average of 18.1 percent more total solids and 20.9 percent more vitamin C, than did comparable shaded ones. For Temple oranges, the difference in total solids amounted to 9 percent and in vitamin C 16.7 percent. And for tangerines, the exposed fruit was 23 percent higher in soluble solids and 27 percent higher in vitamin C.

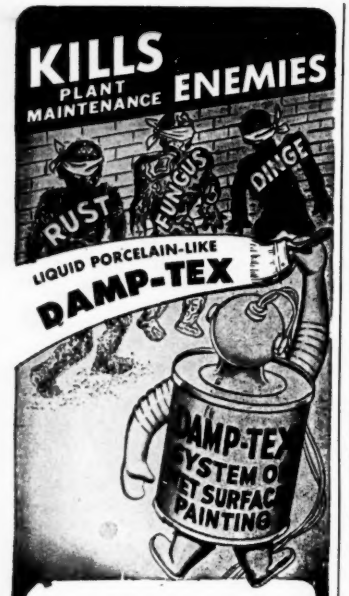
Digest from "Vitamin C Content and Juice Quality of Exposed and Shaded Citrus Fruits," by J. R. Winston and E. V. Miller, *Food Research*, 456-60, Nov.-Dec. 1948.

Vitamins in Canned Foods

When stored at 50 deg. F., canned foods retain a higher percentage of ascorbic acid, carotene, thiamine, riboflavin and niacin than those stored at higher temperatures.

This was ascertained in an investigation when 32 packs of 11 different canned foods of known origin were

(New Technology Continued)



Damp-Tex super-enamel can be applied to surfaces despite moisture, heat, fumes and many other extreme conditions. Its water-proof film retards deterioration, increases efficiency, turns depressing, dingy interiors into gleaming, porcelain-smooth beauty. Resistant to fungus, 2% caustic solution, steam and lactic acid. One coat covers. Comes in white and colors. Used in over 4000 plants. Write for our trial offer.

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WET
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stored for 4, 8, 12, 18 and 24 months at 50, 65 and 80 deg. F. The investigation also involved a study of the effect of commercial warehouse storage on the ascorbic acid, carotene and thiamine content of sweet peas over similar periods.

Canned foods stored at 50 deg. retained a higher percentage of the five vitamins than those stored at the higher temperatures. Vitamin retention was reasonably satisfactory under practically all conditions of storage. Retention of ascorbic acid and thiamine was affected more by temperature than by time of storage, while the reverse was true of riboflavin and niacin. Carotene was least affected by storage conditions.

No consistent evidence was obtained that a food grown and packed in one geographical area retained a higher percentage of its vitamin content than that grown in another.

Digest from "Nutritive Value of Canned Foods," by N. B. Guerrant, O. B. Fardig, M. G. Vavich and H. E. Ellenberger. *Industrial And Engineering Chemistry*, 2258-63, Dec. 1948.

DEHYDRATION

Easily Reconstituted Dehydrated Fruits

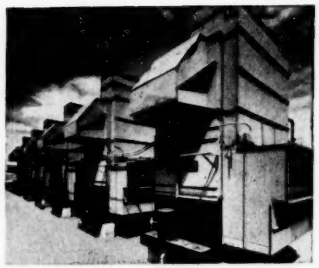
Improvement in the keeping quality, color and flavor, and ease of reconstitution of dehydrated fruits, are the objects of a recently patented method. The method comprises segmenting, sulphuring and dehydrating fruit to a moisture content of 20-25 percent, then applying pressure to bring free moisture to the surface of individual segments.

After predetermined amounts of sugar and a suitable sulphite are added, the product is ground until these ingredients are dissolved and intimately incorporated into the fruit. The mixture is dehydrated to a moisture content sufficiently low (approximately 5 percent) to cause crystallization of sugar within the fruit segments.

Digest from U. S. Patent 2,451,312, issued Oct. 12, 1948, on an application dated June 4, 1945, to R. W. Arengo-Jones, Toronto, Canada, and assigned to Thos. J. Lipton Ltd., Toronto.

Dried Fermented Food

According to a recent patent, fresh ripe vegetables or fruits, or canners' residues of such materials, can be converted into a dried fermented product suitable for human consumption or for animal and poultry feed. When processed for human consumption, the raw material is ground in a micropulverizer to a homogeneous cream-like consistency, and then it is subjected to lacto-fermentation under suitable conditions until lactic acid is



Cut Costs TWO WAYS

By Modernizing Your Refrigeration With This New Condenser System

● Power savings and water savings combine to make money for you when you replace an old fashioned refrigerant condensing method with a modern Niagara AEROPASS Condenser. Either saving quickly returns the cost of the installation; both together make an important reduction in your operating costs for refrigeration.

In this new method the refrigerant gas passes through two cooling coils. The first coil, air-cooled, removes the superheat and condenses oil vapor from the refrigerant; the second condenses the refrigerant by the evaporation of a water spray from its surface. The heat is transferred to the air; less than 10% of the water used in conventional condensers is consumed and you save the cost of the water and the cost of its piping, pumping and disposal.

In addition the Niagara Aeropass Condenser controls the head pressure of your compressors at the lowest point for good operation, reducing your power bills. It does this automatically the year 'round, giving full capacity for peak summer loads and providing the greatest power saving in cold weather.

Hundreds of experiences in all industries that use refrigeration demonstrate these benefits and prove that they give a lasting improvement in refrigeration plant operation.

Write for Niagara Bulletin No. 103 for further information

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developed to an amount of 1-2 percent by volume. The fermented mass is then reduced to one-half or one-third of its volume by vacuum evaporation.

At this stage, the product is self-preserving and may be packed for edible purposes; or it may be dehydrated in a suitable drier, pulverized, and packed. Canners' residues are similarly treated, the final product containing not more than 5 percent moisture.

Digest from U. S. Patent 2,450,335, issued Sept. 28, 1948, on an application dated Apr. 26, 1946, to William P. M. Grelck, Baltimore, Md., assignor of one-half to Linn J. Firestone, Arlington, Va.

DAIRY

Frozen Homogenized Milk Kept Well After Thawing

That frozen homogenized milk may be stored at usual storage temperatures after thawing for longer periods than fluid milk is usually held before use, without deterioration in flavor, bacterial count or acidity, was determined by a recent investigation.

Milk with 3.8 percent fat was pasteurized at 155 deg. F. for 30 min., then homogenized and packaged in ½-pt. paper containers. Samples were stored at 87, 60, 55, 45 and 35 deg. F. Other samples were frozen immediately and stored at −17.5 deg. F. for various periods, after which they were thawed and stored at the same temperatures as the fresh samples. At regular intervals, samples were removed from storage and tested for bacterial content, titratable acidity, pH and flavor.

To determine the effect of age before freezing, 56 samples were divided into 7 groups of 8 samples each. One sample was examined immediately for flavor, bacterial count, coliform organisms, titratable acidity, pH and sediment; the other 7 samples of this group were placed in a freezer held at 0 deg. F. The remaining groups of samples were held at 35 deg. F.

Eight samples, each representing a separate group, were removed from the 35-deg. storage after 12, 24, 48, 72, 96 and 120 hr. and examined for the above characteristics. Each time one sample of a group was used, the remaining 7 were placed in the 0 deg. room. These samples were removed from the freezer, thawed and examined after 5, 28, 38, 47, 56, 76 and 86 days. The flavor of the milk remained good throughout the 120 hr. storage at 35 deg. F. and when it was held up to 47 days in frozen storage. Some of the 56 and 76 day samples had developed a slight oxidixed flavor, and

(New Technology Continued)

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WANTED: YOUR SPRAY PROBLEMS!

Fig. 629

DO YOU WANT TO:

Wax Fruits?
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Humidify Banana Rooms?

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the 86 day samples had a stale and oxidized flavor. Acidity did not vary significantly either before or during frozen storage.

Digest from "Frozen Homogenized Milk. IV. Keeping Quality of Frozen Homogenized Milk After Thawing," and "V. Effect of Age Before Freezing on the Keeping Quality of Frozen Homogenized Milk," by C. J. Babcock, J. N. Stabile, E. Windham, L. B. Evans and R. Randall, *Journal of Dairy Science*, 31, 805-10, 811-15, Sept. 1948.

Testing Milk

Earlier investigators having suggested a combination of the reazurin test with direct microscopic examination as an efficient method for routine testing of milk samples, a more recent study has been made of 1,020 producer samples examined by these two methods. Particular attention was given to the conditions under which the 1-hr. reazurin test could be substituted for other laboratory tests without significantly changing the results obtained.

Results of the current examination indicate that the reazurin test is very efficient in detecting the higher quality milk and the very poor quality milk. Thus by the use of this relatively simple test the laboratory worker may eliminate from further examination the satisfactory samples. The authors suggest that the reazurin test be used as a screening test to eliminate high quality samples from further consideration, and as a means of detecting definitely low quality milk as a guide for further examination by the more time consuming methods.

Digest from "A Combination of the Reazurin Test and the Direct Microscopic Count for the Bacteriological Examination of Milk," by A. L. Bortree and R. D. Spencer, *Journal of Milk and Food Technology*, 11, 255-98-68, Sept.-Oct., 1948.

FERMENTATION

Pasteurization of Beer

Sterile filtration of beer prior to filling into sterile bottles under aseptic conditions and capping with sterile crowns, has been practiced in Germany for a number of years as a method of avoiding pasteurization in bottles. With well-matured lager beers the method is quite successful, but the drastic filtration required for sterility produces decolorization and a reduction in fullness and sweetness in the top fermented English ales, especially in milds, stouts and browns.

Elimination of pasteurization in the bottle reduces fuel and power consumption and avoids losses from breakage. The flavor of the beer is likely to be better also since overheating is entirely avoided, and the over-pasteurized flavors do not develop. Flash

pasteurization at 160 deg. F. using a plate-type heat exchanger (Paraflow) was effective for pre-bottling pasteurization after which the beer was filled aseptically into sterile bottles and capped with sterile crowns.

The heat exchanger and receiving tanks are sterilized. Then fully carbonated beer at 32 deg. F. is put through the heat exchanger, where it is heated to 160 deg. F. for 15-25 sec. In the cooling section of the heat exchanger the beer is cooled again to 32 deg. F. before entering the sterile receiving tank. To avoid the excessively high pressure that results from heating fully carbonated beer, extra plates are used in both heating and cooling sections of the exchanger to provide gas chambers, and the pressure in the heat-exchanger does not exceed 45 lb. Gases driven off in heating are completely absorbed again on cooling.

Steam and boiling water are used freely for sterilizing lines, tanks and filters. Crowns are most successfully sterilized by exposing them in linen or muslin bags to formaldehyde fumes.

Flash pasteurization made beers very much less susceptible to chill haze than beers pasteurized in bottles. Head retention is either not affected or is slightly improved.

Digest from "Pre-Bottling Pasteurization of Beers and Sterile Filling," *Journal of the Institute of Brewing*, Vol. LIV, 295-99, Nov.-Dec. 1948.

MICROBIOLOGY

Sugar Refinery Losses

Sugar losses during diffusion from beet cossettes into the water surrounding them can be the result of both respiration of the beet tissues and bacterial action, but the latter is the more important of the two. A mixture of chopped beet and water at 122 deg. F. evolved gases at the rate of 700 ml. per 100 g. in 44 hr. Sterile beet, on the other hand, in sterile water evolved only a negligible amount of gas in the same period, indicating that gas formation is essentially bacterial. The gases formed are predominantly nitrogen, but also contain carbon dioxide (up to 20 percent), oxygen and hydrogen. The gases collect in the top of the diffusers and have been reported to contain as much as 43 percent hydrogen in some badly infected German factories.

Lactic, acetic and butyric acids are also formed, and sucrose is inverted. In laboratory experiments, sucrose was destroyed in 500 ml. of 12 percent juice at the rate of 0.85 g. per hr. This corresponds to 14 lb. of sucrose per hr. in a diffuser containing 4 tons of beet

(*New Technology* Continued)

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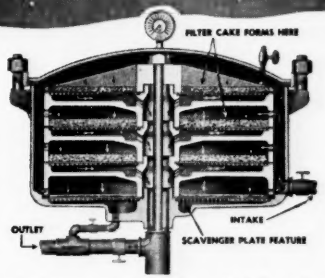
SPARKLER *horizontal plate* FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



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Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

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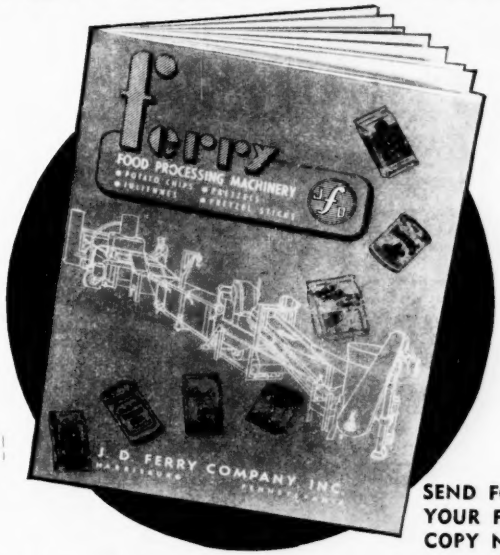

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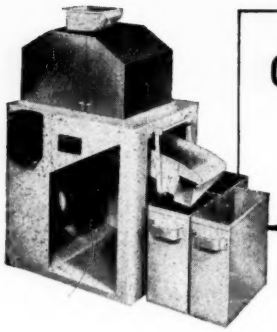

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cossettes, but would be considerably less in the diffusers of a battery in which the sugar content is low.

Organisms responsible for the changes are thermophilic lactobacilli and thermophilic anaerobic gas-formers. Both types are largely inhibited above 149 deg. F., so that their effects can be avoided by maintaining diffuser temperatures above 158 deg. F.

Digest from "Microbiological Problems in the Manufacture of Sugar From Beet. II. Losses Due to Fermentation During the Diffusion Process," by L. A. Allen, A. H. Cooper and M. C. C. Maxwell, *Journal of the Society of Chemical Industry*, Vol. 67, 450-77, Dec. 1948.

MATERIALS

Corrosion of Aluminum In Juice Containers

Because of their natural acidity, fruit juices corrode aluminum and Al alloy containers used for their transportation and storage. However, if SO_2 is used as a preservative, the corrosive effect may be much greater. In the case of apple juice, corrosion is largely due to the malic acid present; added CO_2 has little if any effect.

In black currant, grapefruit, lemon and orange juices, SO_2, added either in gas form or as potassium metabisulphite, attacks the alloys structurally and may pit pure aluminum seriously. Below 350 ppm. SO_2 for lemon juice, and 700 ppm. for the other juices, there will be only very slight corrosion and little or no pitting, with no noticeable effect on taste or smell of the juices. Corrosion by citrus fruit juices was not greatly affected by concentration and is only partly due to their citric acid content.

Aluminum of 99.5 and 99.8 percent purity, and alloys containing 1¼ percent Mn and 2 percent Mg were tested. The highest purity Al usually was the most resistant to corrosion, though the alloys were not far behind.

Digest from "Aluminum and Fruit Juices," by P. E. Gilroy and F. A. Champion, *Journal of the Society of Chemical Industry*, Vol. 67, 407-10, Nov. 1948.

FATS AND OILS

Cottonseed Gossypol

Pending successful synthesis of gossypol, cottonseed pigment glands constitute the best available source of this versatile chemical. Separation of the pigment glands from cottonseed meal by the flotation process provides a concentrated product from which gossypol is readily recovered by solvents.

In the tests under consideration, two

solvents and two methods of recovery were found most satisfactory. Diethyl ether will completely extract gossypol from cottonseed pigment glands in 24 hr., but the extraction time can be reduced to 5 min. if powdered glands are agitated with the solvent and decolorizing carbon in a Waring Blendor. Subsequent separation of the gossypol can be accomplished by the addition of light petroleum naphtha. Acetone also gives complete extraction of gossypol from glands in 2 hr., but treatment in the Waring Blendor will reduce the time to 5 min. Final recovery is by precipitation with glacial acetic acid and subsequent hydrolysis in hot water.

Based on percentage yield, the acetone-acetic acid method is preferred. Observing certain precautions for obtaining high yields, the laboratory procedure can be applied to large-scale operations. Special precautions also are required to prevent deterioration of gossypol in storage.

Digest from "Preparation of Gosspol From Cottonseed Pigment Glands," by L. E. Castillon, C. M. Hall, and C. H. Boatner, JOURNAL OF AMERICAN OIL CHEMISTS' SOCIETY, Vol. 25, 233-36, July 1948.

MISCELLANEOUS

Dustless Drying Process

Avoiding the use of dust collecting or precipitating apparatus, a recently patented process of drying is reported particularly applicable to powdery materials and substances whose drying is usually accompanied by dust formation.

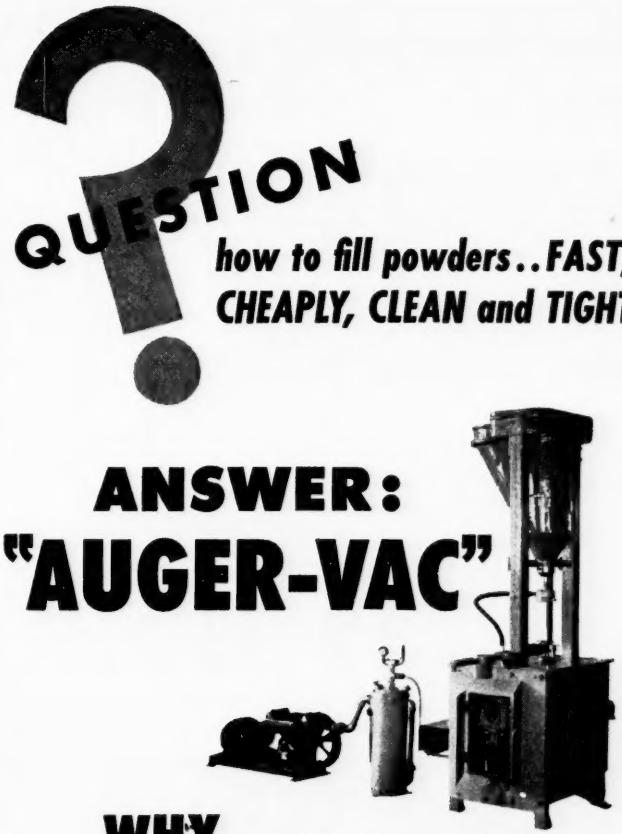
The process consists of passing the material to be dried between walls which have a porosity to allow passage of gaseous drying agents, yet prevent the passage of dust. Flue gases or similar waste gases may be used as the drying agents, because the dust and ash accompanying such gases will be held back by the porous outer wall through which the hot gases pass.

A suitable form of construction consists of a housing containing two concentric porous pipes of ceramic material. The space between the two pipes is the drying chamber. The inner pipe is closed at one end and connected at the other with a suction apparatus, such as a fan. Rotatably mounted on the inner pipe is a screw conveyor which moves the material to be dried from the feed to the discharged end of the outer pipe.

In operation, drying gas would be introduced into the housing, drawn through the outer porous pipe into the drying chamber, thence through the inner pipe to a point of discharge or re-use.

Electric or other form of heat may

(New Technology Continued)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ANSWER:
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WHY.. Dust and spillage are a thing of the past! It's the skillful combination of auger and vacuum that does the job . . . does it well. The Auger-Vac turns out from 10 to 20 units a minute—each container filled tight to the exact amount required. Powdered milk, cocoa—in fact, any powder filling job is an economical and efficient operation—because of Auger-Vac, another fine product of Stokes and Smith.
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Your Floor Jointing too, must be PROOF AGAINST CORROSION ATTACK!

When the concrete floor was laid in this sugar refinery, the panel you see of Atlas acid-proof brick and acid- and alkali-proof cement, was placed in a wet spot in the sweet liquor room. In four years the concrete around it has twice disintegrated, but the Atlas panel remains exactly as when first installed—completely impervious to acid attack.

In candy and preserve factories, bakeries and other food plants where sugar is used extensively, recurring floor trouble must be reckoned with. The preserve plant Atlas floor pictured above, has been in service for many years and has required no maintenance.

Acid-proof brick or tile alone, won't make a corrosion-proof floor. Unless the jointing material used also is impervious to attack, the floor will soon disintegrate.

Atlas Floors — serving in many of the country's largest food plants — are joined with ALKOR, the *original* acid- and alkali-proof cement.

Your Atlas Floor, installed by an Atlas-certified contractor, will withstand any and every specified food acid and alkali, as well as blood and other animal wastes — and hot water and steam, used in cleaning and sterilizing. In addition, it will remain smooth and will stand up for years.

Atlas engineers will be glad to work with you in solving your acid-proofing problem, furnishing recommendations, plans and estimates — without obligation. Write for further information.

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be applied in the housing to maintain the gaseous drying agent at the desired temperature. Drying performance is influenced not only by the temperature to which the material is subjected, and the time factor, but also by the velocity with which the drying gases are forced through the apparatus.

Digest from U. S. Patent 2,444,383, issued June 29, 1948, on an application dated June 15, 1944, to F. E. Stynler, New York City

Metals in Foods

Metals occur in foods both naturally and as contaminants picked up in processing. Arsenic is usually introduced by processing chemicals or agricultural spray residues, but some foods can acquire it during growth. Yeast, for example, can take up 24 ppm. from media containing the toxic element. Fish and shellfish may contain large amounts, with 119 and 174 ppm. having been found in mussels and prawns, respectively.

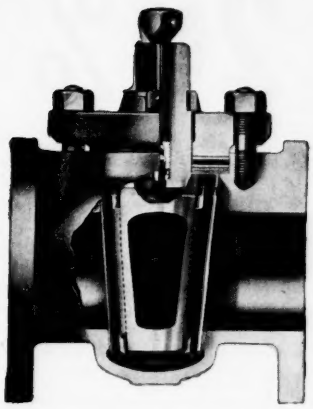
Lead from plumbiferous soils, or from dusts in the neighborhood of smelters or industrial towns, may result in vegetables or truck crops of high lead content. Solders used in fabricating cooking equipment or cans are sources of this metal in foods such as corned beef or luncheon meats. Enamels containing lead behave similarly. Foods imported in lead-lined chests, such as tea or dried coconut, have been known to pick up as much as 25 ppm. lead, and in the layers next to the lining, 45 ppm.

Copper is rarely found in toxic quantities, but contamination may arise from processing equipment or spray residues. Liver and shellfish contain copper in amounts of 50 ppm. or more. Zinc is widely distributed in food materials, with leafy vegetables containing 1-10 ppm., and eggs, flour and meats, 20-50 ppm. Galvanized equipment is the main source of this contamination, but is not a serious one. Findings of antimony and cadmium usually may be traced to misuse of containers not intended for food.

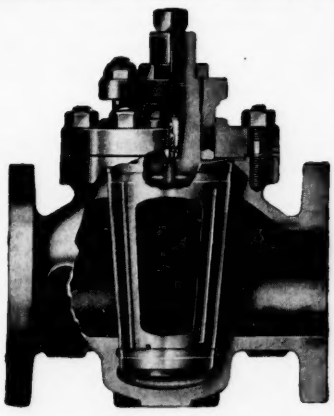
As a source of toxic materials, food wrappers should not be overlooked. Cheese wrapped in tin-foil may easily acquire 300-600 ppm. tin, from this source and in the layers next to the foil, 2.1-2.4 percent have been found. Printing inks used on food wrappers, are normally free of heavy metals, but accidentally or carelessly, inks containing lead in the drier might be used. In one case, an ink proposed for food wrappers even contained 2.5 percent arsenic trioxide!

Digest from "The Occurrence of Metallic Contaminants in Foods", by G. E. Forstner, CHEMISTRY AND INDUSTRY, No. 32, 499-501, Aug. 7, 1948.

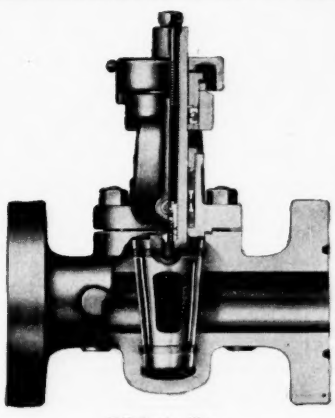
—End



Single Gland Type



Regular Gland Type



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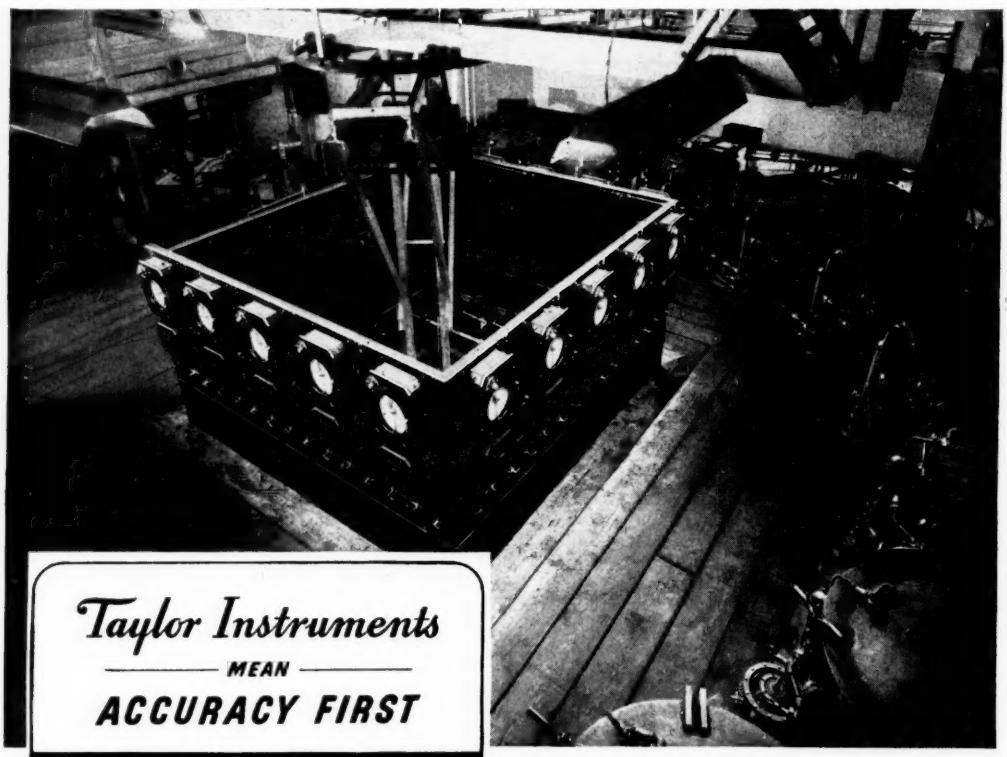
To carry processing economies even further the Ritter plant also uses Taylor controls on blanchers and exhausters. And they use Fulscope Temperature Controllers on pasteurizers, deaerators, holding tanks, cooling canals and cooking kettles.

Another reason why we say, whatever your processing problem, we can supply a dependable Taylor Control System to help solve it. We're in business to keep your quality up and costs down. Ask your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*



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Books

Bread Wrapper Review

PACKAGING OF BAKERY PRODUCTS. *By C. B. Faulstich and W. B. Bradley. Published by American Institute of Baking, 1135 Fullerton Ave., Chicago 14, Ill., 1949, 30 pages, mimeographed one side; 8½ x 11 in.; paper. Price $1.*

First of a series of reports on this subject, this booklet is a review and annotated bibliography of bakery packaging since the introduction of bread wrapping as a protection during distribution. All available literature on packaging has been abstracted and included. Only the articles pertaining to the functional value of the package are considered.

Included are reports on effect of wrapping on flavor, greater increase of acidity in unwrapped bread, cooling before wrapping, grease resistance of papers, moisture resistance, and need of considering bacterial counts in evaluating food packaging materials.

Abstracts are of articles written from 1908 to 1948 on packaging of all kinds of baked goods. Charts are included.

Tests for Top Side

WHAT'S YOUR MANAGEMENT I. Q.? *Compiled by Ellis H. Wooley.* 12 *pages; price,* 20c. *Also* SELF-ANALYSIS QUIZ FOR SUPERVISORS AND EXECUTIVES. *By Rexford Hersey.* 24 *pages; price,* 25c. *Paper-covered pamphlets published by American Management Association,* 330 *W.* 42nd *St., New York* 18, *N. Y.,* 1948.

The titles here explain the booklets. They provide the questions; you fill in the answers. The questions cover the whole gamut of problems and policies, and you get the right answers at the end of each booklet.

Milk Properties

TESTING MILK AND MILK PRODUCTS FOR FAT AND TOTAL SOLIDS. *By E. O. Herreid, Urbana, Ill. Published by University of Illinois College of Agriculture, 80 pages; 6x9 in.; paper. Free.*

A description is given of testing procedures and technics which have yielded reliable results in tests of milk and milk products, with the elementary physical and chemical properties of milk provided as background material.

The report, identified as Circular No. 630, includes discussions of milk constituents and their properties; factors that affect fat content of separated cream and market milk; standards, definitions and regulations; the Babcock test for fat in milk and cream, and modified Babcock procedures for other milk products; also other tests for milk and milk products and a description of a testing laboratory and proper care of equipment.

The booklet is illustrated, and included is a table of equivalents and a bibliography.

Smell Book

ODORS. *By Carey P. McCord and William N. Witheridge. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1949. 405 pages; 6¼x9½ in.; cloth. Price, $6.50.*

Probably the first work exclusively on the subject of odors and their control, this book tells a great deal more than most food plant operators will want to know. It begins with the anatomy of the olfactory system, covers the hedonics of odors (psychology of pleasant versus unpleasant) and their industrial aspects, then winds up with a widely selected documentation of legal opinions covering odor control.

Applied to such industrial activities as food research, air conditioning, sewage disposal—to name three—the book outlines practical methods to be followed in odor elimination. There is also an extensive bibliography covering every possible phase of the subject.

Government Publications

PRODUCTION OF MANUFACTURED DAIRY PRODUCTS, 1947. *Bureau of Agricultural Economics.* Unnumbered mimeographed document issued December, 1948, giving detailed statistical review.

RESIDUAL SPRAYS FOR USE AGAINST THE CONFUSED FLOUR BEETLE. *By R. T. Cotton, et al. Bureau of Entomology & Plant Quarantine. E-766. Mimeographed.* A summary of effectiveness of various formulas used under different conditions.

THE NEW INSECTICIDES FOR CONTROLLING EXTERNAL PARASITES OF LIVESTOCK. *Bureau of Entomology & Plant Quarantine, E-762. Mimeographed.*

EQUIPMENT FOR DISPERSING INSECTICIDES FROM AIRCRAFT. *By Frank S.*

(Books Continued)

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Simply place an ATI Cook-Chex retort tag on each basket before cooking. When tag turns green, you *know* the food is fully cooked.

No Worry!

ATI Cook-Chex retort tags are unfailingly accurate. They guarantee you against human error. They safeguard consumer good-will and company profits.

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Grocery Store Products Co.
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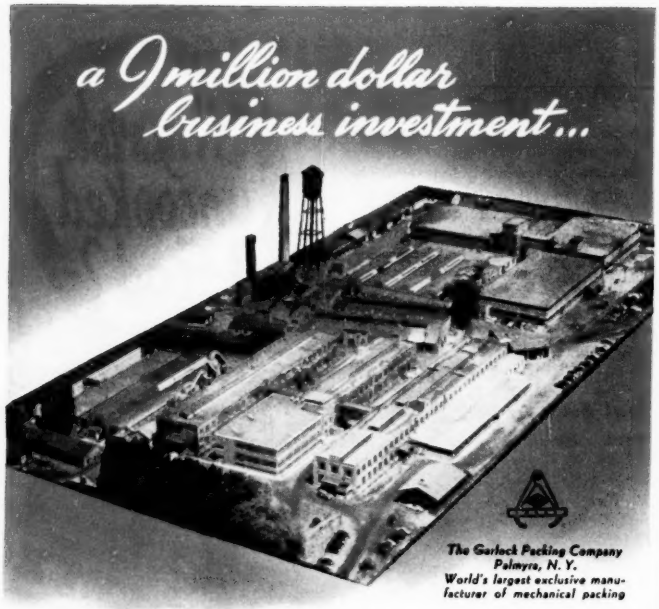
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Faulkner and C. C. Deonier. Bureau of Entomology & Plant Quarantine, E-262. Describes recommended procedures and apparatus.

REPORTS ON GROUND-WATER INVESTIGATIONS. *U. S. Geological Survey unnumbered press release.* Lists a considerable number of reports of field investigations, each of local geographic interest, which can be consulted in the offices of the Survey or in collaborating offices near the area surveyed. Inquiries can request assistance as to the quantity and quality of ground water available, by indicating the precise location for which information is needed.

EFFICIENT USE OF FOOD RESOURCES IN THE UNITED STATES. *By Raymond P. Christensen. Bureau of Agricultural Economics, Technical Bulletin No. 963. Price 25c.* A broad economic discussion of trends and problems affecting national food supply and consumption.

MARKETING MARGINS AND COSTS FOR POULTRY AND EGGS. *By E. P. Winter. Bureau of Agricultural Economics. Technical Bulletin No. 969. Price 15¢.* An elaborate statistical analysis with little attention to factory features.

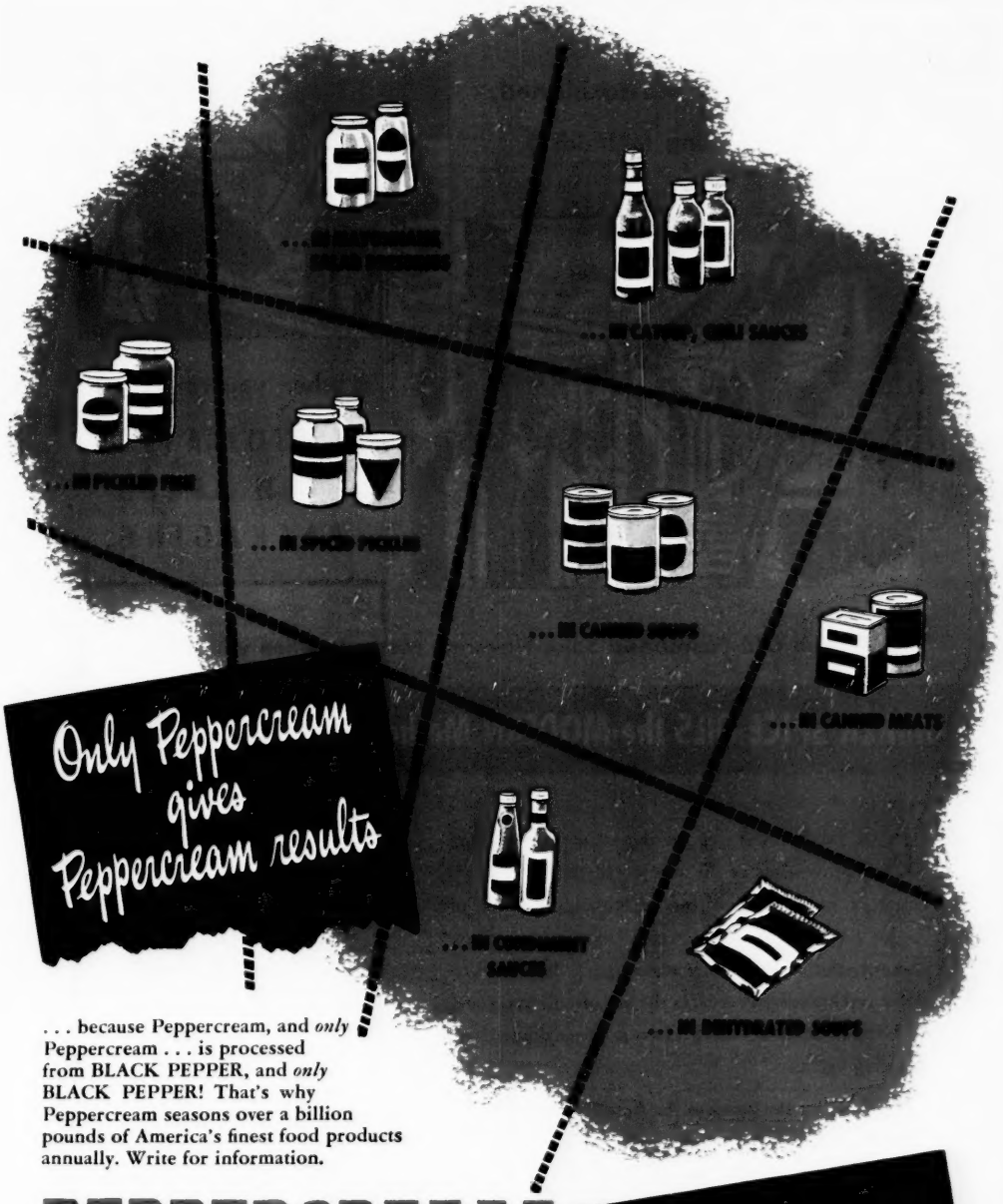
VOLUMETRIC DETERMINATION OF SMALL AMOUNTS OF REDUCING SUGARS BY A MODIFIED LANE-EYNON PROCEDURE. *By C. A. Fort. Bureau of Agricultural & Industrial Chemistry, AIC-207. Available from Southern Regional Research Laboratory, New Orleans 19, La. Mimeographed.*

USING 2,4-D SAFELY. *Prepared by L. S. Evans, et al. U. S. Department of Agriculture Farmers' Bulletin No. 2005. Price 5c.* Gives precautions for protection of nearby crops, and some precautions on hazards for men and animals.

PRODUCING FEED AND FLOUR FROM WHITE POTATOES WITH STEAM TUBE DRIERS. *By P. W. Edwards, et al. Bureau of Agricultural & Industrial Chemistry. AIC-209. Available from Eastern Regional Research Laboratory, Philadelphia 18.* Includes process flowsheet, also estimates of investment required and plant costs to be expected.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.

—End



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Patents

Butter and Like Molded Continuously and Automatically—Joseph O'Connell, Kensington, Victoria, Australia. No. 2,451,301. Oct. 12, 1948.

Dehydrated Raw Fruit Ground and Pressed to Bring Juice to Surface Preliminary to Addition of Sugar and Sulphite Preservatives, Further Crushed to Uniformly Incorporate Solution Into Fruit Tissue and Further Dehydrated to Crystallize Sugar Within Mass of Each Fruit Piece—Rhys W. Arengo-Jones, to Thomas J. Lipton Ltd., Toronto, Ontario, Canada. No. 2,451,312. Oct. 12, 1948.

Fruit Pie Filling Made From Dehydrated Fruit Pressed to Express Juice Preliminary to Addition of Sugar, Starch and Sulphite Preservatives; Ground to Dissolve Sugar and Sulphite and Uniformly Distribute Starch Throughout Mass and Further Dehydrated to Reduce Moisture Content to Less Than 10 Percent—Rhys W. Arengo-Jones, to Thomas J. Lipton, Ltd., Toronto, Ontario, Canada. No. 2,451,313. Oct. 12, 1948.

Confections Packaged in Spirally Wound Roll Consisting of Outer Layer and Inner Layer of Flexible Material With Inner Layer Having Plurality of Spaced Rows of Recesses to Contain Confection Pieces—Jack Burstiner, New York City. No. 2,451,318. Oct. 12, 1948.

Coffee Beans and Like Hot-Air Dried in Unit Equipped With Movable Agitator and Gas-Circulating Means—Adolfo Raul Yglesias-Paz, Guatemala City, Guatemala. No. 2,451,462. Oct. 19, 1948.

Continuous Process for Mashing Cereals Developed to Include Gelatinizing in First Zone and Saccharification in Second Zone by Addition of Malt With Reduction of Pressure and Temperature—Ellis C. Pattee, Cincinnati, to National Distillers Products Corp. No. 2,451,510. Oct. 19, 1948.

Mixed Nuts and Like Mechanically Weighed and Packed—Sofus Christensen, Valley Stream, N. Y., to Graham Co., Inc., New York City. No. 2,451,534. Oct. 19, 1948.

Eggs Candled During Passage Over Light Sources on Endless Conveyor With Series of Spaced Apertures to Receive and Hold Eggs During Movement of Conveyor—Wesley J. Roberts, Hot Springs, Ark. No. 2,451,577. Oct. 19, 1948.

Sweet Chocolate Made by Mixing Liquefied Chocolate Liquor Into Super-Saturated Sucrose Syrup at Temperatures Below Crystallization Point of Sugar, Working Mixture and Warming It to Temperature at Which Sugar Separates in Fine Crystal Form With Subsequent Drying—Edward F. McGee, Wayland, Mass. No. 2,451,630. Oct. 19, 1948.

Proteins Recovered From Soy Beans in Presence of Enzyme Inhibitors and Liquid Organic Compounds With Low Solubility in Water to Form Absorption Compounds With Protein, Exclude Oxygen From Contact With Protein Molecule and Prevent Molecular Aggregation During Drying—Francis E. Calvert, to Drackett Co., Cincinnati, Ohio. No. 2,451,659. Oct. 19, 1948.

Oxidation Inhibitor for Fats and Oils Made to Consist of Fatty Acids and Glycerides of Fatty Acids, from 0.001 to 0.01 Percent NGDA and Not to Exceed 0.02 Percent Phosphoric Acid—H. R. Kraybill and B. W. Beadle, Chicago, to Trustees for Benefit of American Meat Institute Foundation. No. 2,451,748. Oct. 19, 1948.

Shrimp Treated With Chlorine Dioxide to Inhibit Development of Iodoform Taste—Eric R. Woodward, New York City, to Mathieson Chemical Corp.. No. 2,451,897. Oct. 19, 1948.

Doughnuts Glazed by Mechanical Means—Michel J. Gendusa, New Orleans, La. No. 2,451,940. Oct. 19,1948.

Enzymes Active Within Range of pH 5 to 11 Precipitated From Aqueous Solutions by Use of Water-Soluble Alkali-Cook Lignin—J. S. Wallerstein and R. T. Alba, to Wallerstein Co., Inc., New York City. No. 2,452,000. Oct. 19, 1948.

Fish and Like Smoked in Oven Having Closed In Fireplace With Means for Conducting Smoke Between Walls of Oven and Fireplace and Means for Regulating Draft in Fireplace—A. L. Lyon, Eastport, Me.; Z. A. Lyon, R. C. Emery and C. C. Norton as executors of A. L. Lyon, to Z. A. Lyon, R. C. Emery and C. C. Norton, Eastport, Me. as Co-trustees. No. 2,452,016. Oct. 19, 1948.

Fruits and Vegetables Packed in High Handled Containers With Bottom Forming Portion—James A. McCormick, Kalamazoo, Mich., to

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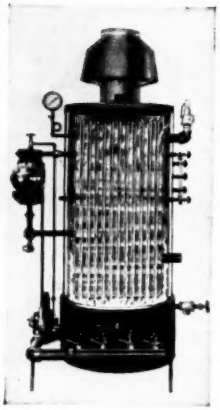

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Patents

Fruit & Produce Packing, Inc., Indianapolis, Ind. No. 2,452,204. Oct. 26, 1948.

Hamburgers Mechanically Portioned, Formed and Wrapped—Ken E. Bemis, Oakland, Calif. No. 2,452,218. Oct. 26, 1948.

Egg Meats, Mixed With 0.5 to 10.0 Percent Pectin and Dehydrated for Use in Baking and Confectionery Mixes—Suzanne Mabel Lavinia Tritton, Loughton, England. No. 2,542,506. Oct. 26, 1948.

Mold Enzymes Added to Cooked and Converted Cereal Starch Medium for Yeast and Lactic Acid Organisms—George A. Jeffreys, Salem, Va. to Nelson Littell, New Canaan, Conn. No. 2,452,534. Nov. 2, 1948.

Fish Mechanically Compressed Into Predetermined Volume and Shape Preparatory to Automatic Filling Into Cans Moving on Conveyor—Max K. Kuther, Monterey, and James Leonard Smith, Pacific Grove, Calif. No. 2,452,666. Nov. 2, 1948.

Cocoa Added to Sugar Syrup at From 250 to 320 Deg. F. With Continuous Beating Until Dry, Powdery Product is Obtained—Louis Lang to National Sugar Refining Co., New York, N. Y. No. 2,452,770. Nov. 2, 1948.

Beer Stabilized Against Radiation Deterioration by Packaging in Container Which Excludes Short Light Waves of Below 5,600 Angstrom Units and, to Large Extent, Light Waves Longer than 7,000 to 10,000 Angstrom Units—Erwin C. Uihlein, Grafton, Wis., and James W. Lawrie, Milwaukee, Wis., to Jos. Schlitz Brewing Co., Milwaukee, Wis. No. 2,452,968. Nov. 2, 1948.

Foods Dehydrated by Contact With Gas and Simultaneously Fluffed to Increase Gas Contact and to Move Units of Decreasing Specific Gravity at Increased Rate Through Dehydration Units—Clarence Birdseye to Dehydration, Inc., Gloucester, Mass. No. 2,452,983. Nov. 2, 1948.

Discoloration of Butt Ends of Lettuce During Shipment, and Development of Detrimental Plasmolysis, Inhibited by Use of Neutral Aqueous Solution Containing From 0.04 to 1.0 Percent Formaldehyde During Shipment Under Refrigeration—Jagan N. Sharma, Los Angeles, Calif., to William H. Wilson, Annetta E. Wilson, Nancy J. Doyle, William H. Wilson, Jr., Robert M. Wilson, and A. H. Wilson. No. 2,453,040. Nov. 2, 1948.

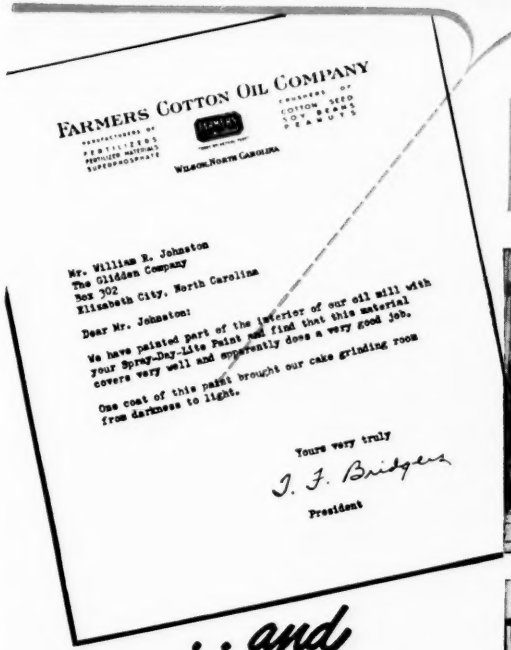
Full-Flavored Citrus Fruit Juice Concentrates Made by Evaporating Whole Citrus Fruit Juice Under Vacuum, Diluting Concentrate With Fresh Unconcentrated Deaerated Juice to Half the Previous Concentration, Sealing and Freezing—Louis G. MacDowell, Lakeland, and Edwin L. Moore and Cedric D. Atkins, Winter Haven, Fla., to United States of America. No. 2,453,109. Nov. 9, 1948.

Vegetables and Fruits Cut to Give Plurality of Slices Connected at One Edge and Spread to Expose Cut Surfaces to Refrigerating Means Maintained at Quick-Freezing Temperature—Albert F. Hoffman, East Orange, N. J. No. 2,453,130. Nov. 9, 1948.

Solids of Acid, Sugar-Bearing Juice Combined With Hemicellulose Material and Calcium-Bearing Phytate to Form Dry Product—Royal Lee to Lee Foundation for Nutritional Research, Milwaukee, Wis. No. 2,453,142. Nov. 9, 1948.

(Patents Continued)

from darkness to light



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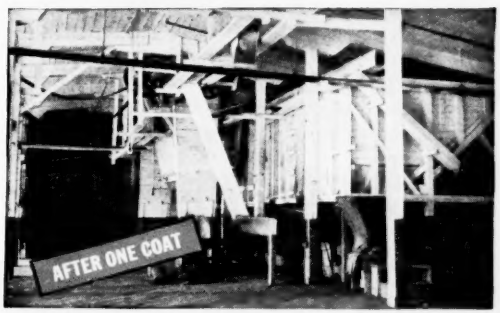

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Patents

Milk Spray Dried to Predetermined Moisture Level and Flash-Cooled Under Vacuum to Lower Moisture Content to Desired Final Percentage—Helge Shipstead, Syracuse, N. Y., to Borden Co., New York, N. Y. No. 2,453,277. Nov. 9, 1948.

Fats Removed From Rutin Extracts by Filtering Aqueous Solution of Rutin and Impurities Through Glass-Fiber Filter—James F. Couch, Glenside, and Charles F. Krewson, Erdenheim, Pa., to United States of America. No. 2,453,305. Nov. 9, 1948.

Starch and Gluten in Suspension of Ground Grain in Water Subjected to Gravity Separation by Drawing Off Gluten From Receptacle With Cone-Shaped Bottom and Starch Through Side Perforated Pipes While Kept in Motion With Air Directed Circumferentially Along the Walls of Receptacle—Lou Buck Edsall, Wyandotte, and Acton Keith Kilander, Gibralter, Mich., to Chemprotin Products, Trenton, Mich., and Laszlo Kormendi, New York, N. Y., and B. Clark Boeckeler, Grosse Ile, Mich. No. 2,453,310. Nov. 9, 1948.

Dough for Lattice-Work Pie Crusts Formed by Mechanical Means—Kurt Schlegel, New York, N. Y. No. 2,453,599. Nov. 9, 1948.

Menhaden Freed of Skin, Scales and Oil and Packaged for Marketing—George T. Harrison, Tilghman, Md. No. 2,453,625. Nov. 9, 1948.

Gelatin Made From Hides and Other Collagen- or Ossein-Containing Materials With Fat or Wax Content—Joseph Kenyon, Barnes, and Victor Silberstein, Kensington, London, England, one-third to Hatim Attari, London. No. 2,453,630. Nov. 9, 1948.

Cream Separated From Whole Milk, Divided Into Small Continuous Streams and Impacted Against Vertical Rotating Blade Surfaces With Homogenizing Effect—James B. McFadden, to United Dairy Equipment Co., West Chester, Pa. No. 2,453,924. Nov. 16, 1948.

Onions Cleaned and Graded for Size During Passage Over Set of Elongated Rollers—Richard D. Sheppard, Bridgeton, N. J. No. 2,454,015. Nov. 16, 1948.

Vegetables Cut During Passage Between Two Mounted Rollers, One Fitted With Spaced, Radially Arranged and Projecting Blades—Albert G. Wahl, Los Angeles, Calif. No. 2,454,237. Nov. 16, 1948.

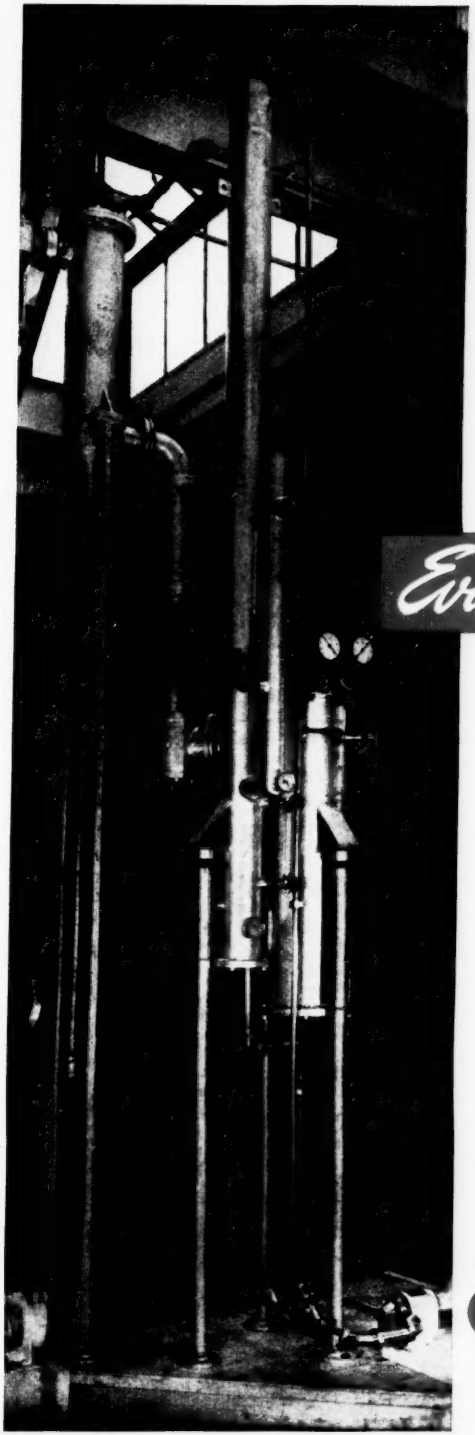
Fish Press Water Treated With Proteolytic Enzyme to Reduce Gel Point and Concentrated—James K. Gunther and Louis Sair, Decatur, Ind., to Central Soya Co., Inc., Fort Wayne, Ind. No. 2,454,315. Nov. 23, 1948.

Elongated Sheets of Dough Trimmed for Width and Divided Into Strips by Rotary Knife Action While Moving on Endless Conveyor—Erwin Haecks, San Francisco, Calif. No. 2,454,316. Nov. 23, 1948.

Oleomargarine Colored by Fat Soluble Dye Contained in Oil Insoluble Membrane and Dispersible in Oleomargarine—Leon Adler, Harold G. Johnson, and Beeason J. Schneider, to Dyestuffs & Chemicals, Inc., St. Louis, Mo. No. 2,454,420. Nov. 23, 1948.

Butter Blocks Cut Longitudinally While Moving Horizontally Through Machine Equipped With Cutter Head and Cutting Wire Mounted for Vertical Reciprocation—Einar A. Anderson, Minneapolis, Minn. No. 2,454,421. Nov. 23, 1948.

—*End*



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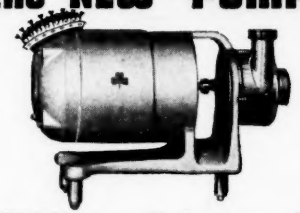

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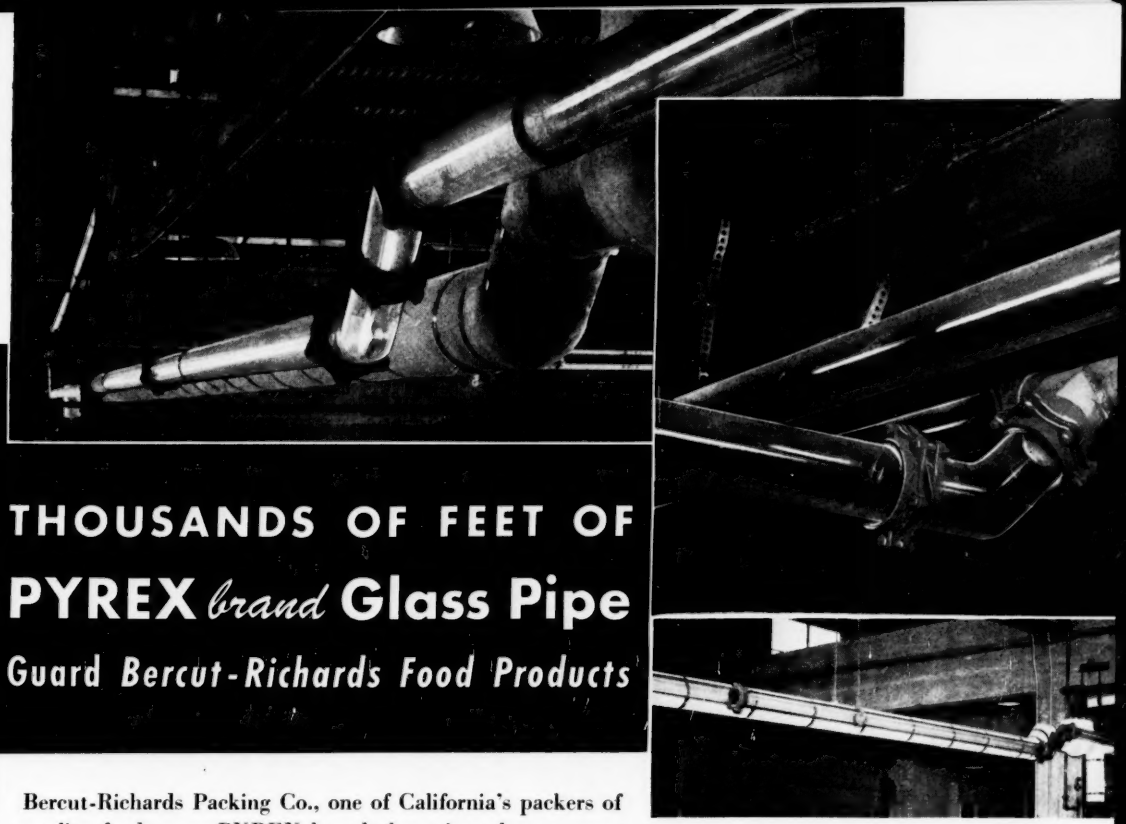


THOUSANDS OF FEET OF PYREX *brand* Glass Pipe

Guard Bercut-Richards Food Products

Bercut-Richards Packing Co., one of California's packers of quality foods, uses PYREX brand glass pipe wherever possible. Here is their own experience with it.

"Several thousand feet of PYREX brand glass pipe are utilized to transfer pulped fruit and vegetables to preheaters and from finishers to the can filling machines. These glass lines have been in use for three seasons. There has been no maintenance problem in their use. The benefits we derive may be summarized as follows:

1. Sanitary, easy to inspect clean up job at end of shift.
2. Removes danger of metallic contamination which may affect color, flavor and vitamin content.
3. Operators can determine rate of flow at a glance and take steps to adjust flow to operations.
4. Impaired flow, resulting from pump failure, is easy to spot.
5. There is less chilling of heated juice passing through glass lines.
6. Improper color, resulting from either processing or contamination from defective machine operation, is easily detected."

T. H. Richards, Jr., Vice President
BERCUT-RICHARDS PACKING CO.
Sacramento, Calif.

Some idea of the extent to which PYREX brand glass pipe has been utilized in the Bercut-Richards Packing Co. is shown in photos above. Note method of coupling glass to metal pipe lines.

SEE how many food packers PYREX brand Glass Pipe . . .

Bulletin EA-1, just published, illustrates and describes how people in the process industries are lowering costs and safeguarding product quality with Pyrex brand Glass Pipe. A copy awaits your request. Write or use coupon below.

CORNING GLASS WORKS, DEPT. FI-4,
CORNING, N. Y.

Please send me Bulletin EA-1, "Pyrex brand Glass Pipe in the Process Industries."

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....

CORNING means research in GLASS

CORNING PYREX VYCOR

PLANT EQUIPMENT SALES DEPARTMENT

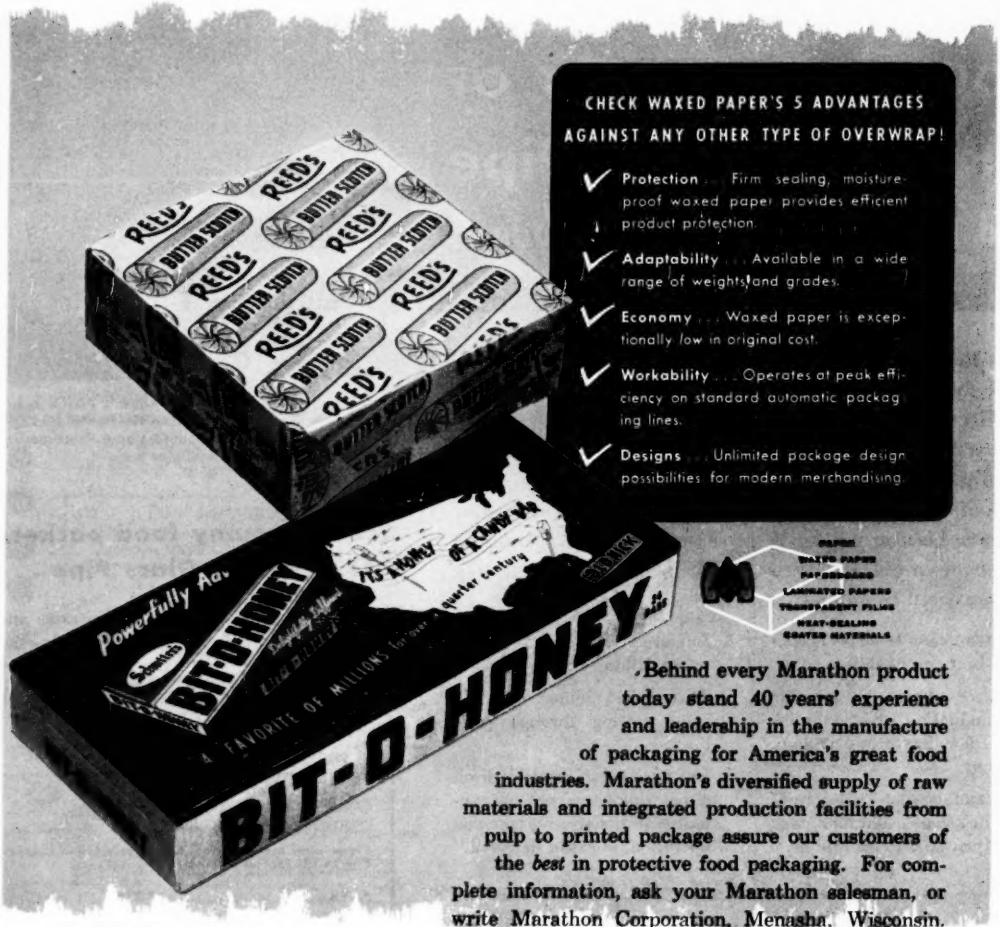
CORNING GLASS WORKS, CORNING, N. Y.

TECHNICAL PRODUCTS DIVISION: GLASS PIPE • SIGNALWARE • LABORATORY GLASSWARE • GAUGE GLASSES • LIGHTINGWARE • OPTICAL GLASS • GLASS COMPONENTS

Marathon Waxed Paper Overwraps

Deliver the goods FRESH!

Marathon Waxed Paper Overwraps answer *every* requirement for modern, efficient outer wrapping of packaged candy units. *Laminated*, heat-sealing waxed paper guards freshness and flavor from plant to distributor to retailer. Brilliant, clean-cut printing on waxed paper's glossy, pure white opaque surface assures quick, easy brand and contents identification at all times.


CHECK WAXED PAPER'S 5 ADVANTAGES AGAINST ANY OTHER TYPE OF OVERWRAP!
✓ Protection . . . Firm sealing, moisture-proof waxed paper provides efficient product protection.
✓ Adaptability . . . Available in a wide range of weights and grades.
✓ Economy . . . Waxed paper is exceptionally low in original cost.
✓ Workability . . . Operates at peak efficiency on standard automatic packaging lines.
✓ Designs . . . Unlimited package design possibilities for modern merchandising.
PAPER
WAXED PAPER
PAPERBOARD
LAMINATED PAPERS
TRANSPARENT FILMS
HEAT-SEALING COATED MATERIALS
PEED'S
BUTTER SCOTCH
Powerfully Aa-
BIT-O-HONEY
A FAVORITE OF MILLIONS for over a quarter century
BIT-O-HONEY

Behind every Marathon product today stand 40 years' experience and leadership in the manufacture of packaging for America's great food industries. Marathon's diversified supply of raw materials and integrated production facilities from pulp to printed package assure our customers of the *best* in protective food packaging. For complete information, ask your Marathon salesman, or write Marathon Corporation, Menasha, Wisconsin.

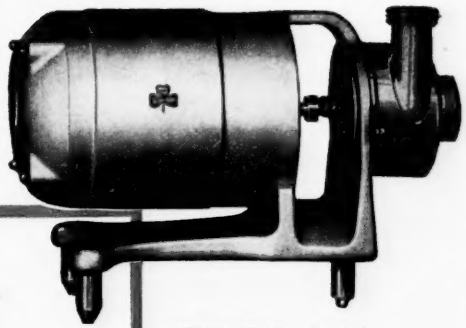
SEE MARATHON'S EXHIBIT (BOOTH 517-518) AT THE PACKAGING EXPOSITION, MAY 10-13, 1949

MARATHON *Protective Packaging*

FOR AMERICA'S FINEST FOODS

EXCLUSIVE Tri-Clover FEATURES

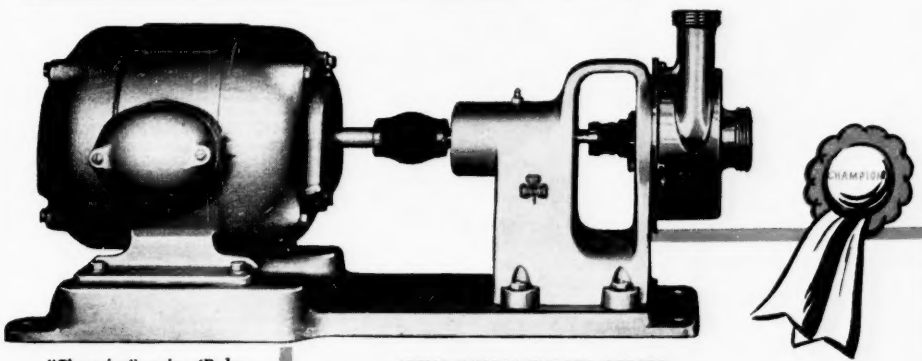
make these PUMPS the LEADERS in their field!



NEW "PUMP KING" SERIES

- Compact "Unimount" close-coupled construction.
- All highly polished stainless steel contact parts.
- Perfect alignment at all times.
- Fewer moving parts . . . easier to disassemble for cleaning.
- Pump head easily adjusted to any discharge angle.
- One-piece sanitary seal . . . easily cleaned, maintains correct sealing pressure without causing wear. (Also available with packing gland construction or water cooled vacuum seals for special applications.)

"Pump King" series sanitary centrifugal pumps are manufactured in 1½", 2", 2½" and 3" inlet sizes with totally enclosed, long-life sanitary motors.



"Champion" series (Pedestal Mount) sanitary centrifugal pumps are manufactured in 1½", 2", 2½" and 3" inlet sizes, in capacities up to 600 g.p.m.

NEW "CHAMPION" SERIES

- Completely demountable head . . . easily rotated to any discharge angle.
- All contact parts of polished 18-8 stainless steel.
- Patented carbon-faced neoprene seal . . . better efficiency, longer life. (Also available with other seals for special requirements.)
- Aluminum alloy rust-resistant base and bracket . . . stainless steel legs, adjustable for leveling.
- Precision fabrication assures easy, thorough cleaning.
- Totally enclosed sanitary motors.

Tri-Clover MACHINE CO.
Kenosha, Wisconsin

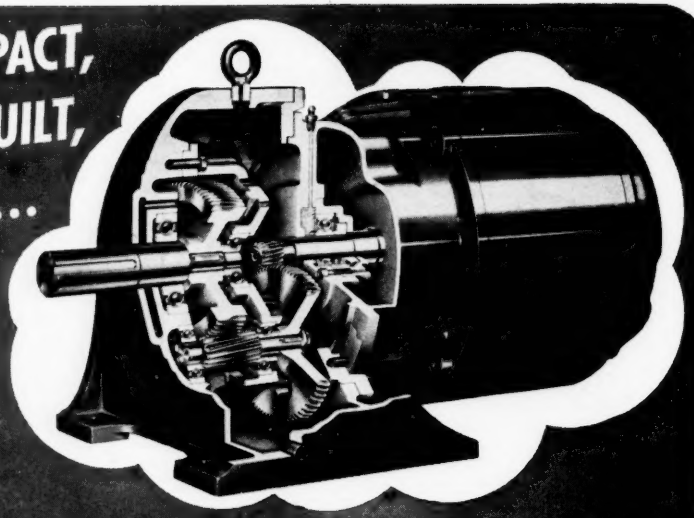
TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

TRI-CLOVER
THE Complete LINE

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

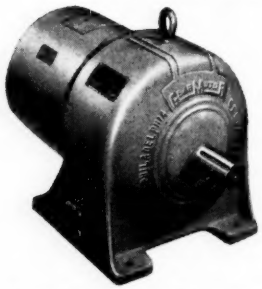
COME TO "PUMP HEADQUARTERS" FOR ALL PUMP NEEDS . . . Tri-Clover offers a complete line of sanitary, brine and water pumps in a wide range of models and sizes for handling clear liquids, heavy liquids, and semi-solids such as tomatoes in chunks, syrups, corn, peas, apple sauce, etc. See your Tri-Clover Jobber or write for Catalog 248.

HERE'S COMPACT, PRECISION-BUILT, DEPENDABLE...



...Motorized Speed Reduction

PHILADELPHIA GEARMOTOR



just check these features

- ✔ **UNLIMITED ADAPTABILITY**—Available in single, double and triple reductions to provide a wide range of speeds with motor ratings from 1 to 60 hp. NEMA "D" type flange mounting permits use of any type enclosure in A-c or D-c motors.
- ✔ **COMPACT DESIGN**—Design conserves space to greatest extent possible without sacrifice of strength or accessibility. This compactness simplifies the direct application of electric drive to individual machines.
- ✔ **BALANCED, INTEGRATED DYNAMICS — FOR STRENGTH**—Design of gear unit in the higher ratios lends triangular stability based on Balanced, Integrated Dynamics. High grade grey iron cast frame gives added strength and shock resistance.
- ✔ **SIMPLIFIED ASSEMBLY**—Motor and gear unit, each self-contained, are readily separated; gears in multi-reduction units may be inspected without uncoupling from driven machine.
- ✔ **PRECISION-BUILT MOTORS**—Reliance Precision-Built A-c and D-c Motors provide dependable power for all models—fit perfectly with gear unit.
- ✔ **QUIET, LONG-LIVED GEARS**—Helical gears are alloy steel—precision-machined, wear-hardened and arranged in simple train for quiet operation and long life.
- ✔ **POSITIVE LUBRICATION**—Splash system with large oil reservoir assures thorough and constant lubrication of all parts of gear unit. Leak-proof housing. Motor, greased independently, has double-shielded ball bearing design.

A self-contained, *extremely compact* unit that conforms to the recommended standards of the American Gear Manufacturers Association and National Electrical Manufacturers Association. . . . Available in single, double and triple reductions. . . . Range of speeds: 780 through 7.5 R.P.M. Motor Rating from 1 H.P. through 60 H.P. . . . A-c or D-c.

Send for new 42 page illustrated catalog, containing full information and data necessary for ordering, and please use your Business Letterhead when requesting same.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Important Questions..

about iron and steel scrap for every top business man in every industry

Q. ***How bad is the shortage of scrap?***

A. Actually, we have enough scrap to get along, but too much of it is *light* scrap. What is badly needed today is more *heavy* scrap.

Q. ***Why more heavy scrap?***

A. Because heavy scrap will produce *more and better* steel in *less* time.

Q. ***Why is the heavy scrap shortage so harmful to our economy?***

A. Half of all the ingredients that are melted to make steel and castings consists of scrap iron and steel. The short supply of heavy scrap during the past year limited the production of steel mills and foundries. At the present record rate of production, there is still not nearly enough steel to meet the current and anticipated demands of our domestic economy, military requirements, and ERP. More heavy scrap will help bridge the gap.

Q. ***What's being done about it?***

A. A drive . . . and everybody is cooperating . . . is being started for industrial scrap, to (1) help step up present steel production, and (2) *create a visible reserve of heavy scrap in the event of national emergency.*

Q. ***Why is there a shortage of heavy scrap?***

A. Several reasons:

1. Very little of the 123,000,000 tons of steel and steel products exported during the war has come back as scrap.
2. With replacements scarce and expensive, much old equipment which would normally have been junked by now, is still in use.
3. A halt has been called on the junking of old vessels and military equipment which has until recently been a source of scrap.
4. The amount of heavy scrap produced in fabrication —the left-overs of machinery, etc.—is not enough to meet the demand for new steel and castings.

Q. ***How about the heavy scrap that must exist in huge quantities in Germany and Japan?***

A. Some of this will be coming through, but not in good quantities until preparation and transportation facilities within those countries improve.

Q. ***Where can additional scrap be obtained from domestic sources?***

A. From industrial plants which have on hand large amounts of heavy scrap in the form of obsolete machinery, idle equipment—tools, dies, jigs, fixtures, etc.—and unnecessarily large repair parts inventories. Such scrap is the best possible type for the manufacture of quality steel.

Q. ***Isn't such material ordinarily turned in as scrap?***

A. Experience shows that plant "housekeeping" is not particularly good when plant production is high. People are too busy. However, if executives realized the critical situation, they would order the necessary steps to be taken.

Q. ***How can I help in this drive?***

A. Appoint one top official in your plant as a Salvage Director —with full authority to give orders and throw out everything that is not going to be needed. Have him consult with your trade association's Steel Scrap Drive Committee. Call in your local scrap dealer. (Incidentally, the prices paid for scrap are the highest ever.) Promote your scrap drive by meetings of department heads and through plant bulletin boards and newspapers.

Q. ***How do I benefit from moving scrap in addition to the money received for it?***

A. 1. You get the use of much-needed and expensive floor space now occupied by such equipment and material.
2. You eliminate the cost of keeping records and inventory.

Q. ***When does the scrap drive start?***

A. Right this minute. The very next thing to do after reading this page, should be to start *your* plant's scrap drive!

Q. ***What is the goal of this drive?***

A. One million tons of *heavy* scrap . . . and "housecleaning" in your plant will help.

A PUBLIC SERVICE PROJECT — THE ADVERTISING COUNCIL

SCRAPPY SAYS:

Search your plant for HEAVY SCRAP ...Help make MORE STEEL!

FOOD INDUSTRIES

Let's get down to Pump *Fundamentals*

CENTRIFUGAL FORCE

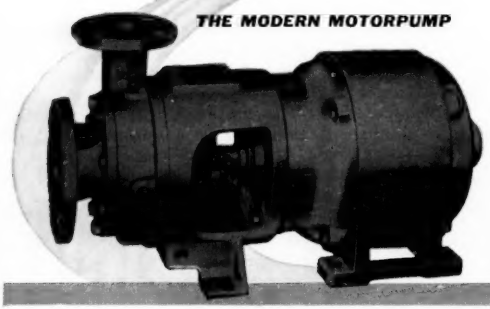
EVER swing a small pail of water in a vertical circle? Never spilled a drop did you? Naturally, you know that centrifugal force kept the water in the pail by forcing it against the bottom of the pail. Had there been small holes in the bottom of the pail the water would have been forced through with considerable velocity.

Basically a centrifugal pump uses this principle. Liquid enters the eye of the impeller and is forced by centrifugal action through small volutes which increase in size to the perimeter of the impeller developing pressure. This pressure is the moving force of the liquid.

PUMP IMPELLER

The outstanding modern centrifugal pump is the Ingersoll-Rand MOTORPUMP. Its carefully designed and precision manufactured impeller and component pump parts gives top performance and reliability.

THE MODERN MOTORPUMP



Look at the scope of just this one line of Ingersoll-Rand pumps, each a compact, self-contained unit with a built-in motor. From the many sizes and types of motorpumps you can select a unit from ¼ to 40 horsepower . . . 10 to 1800 gallons per minute - - - for heads to 600 feet . . . single and multi-stage. I-R Factory trained sales representatives across the nation will gladly help you with your present and future pumping problems. Prompt deliveries can be made from factory and branch stocks. Ask for catalogue No. 7093-A, which gives the complete story on Motorpumps.

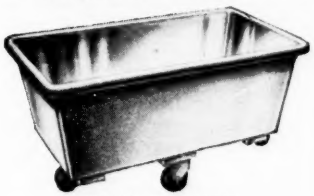
Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 356-9

STANcase STAINLESS STEEL EQUIPMENT

The three units of STANcase Stainless Steel Equipment illustrated below have wide application in all types of food handling plants. *ECONOMY* dictates their adoption for all operations which entail sanitary control, corrosion hazards and where it is necessary to protect quality and flavor of products.

The units illustrated are standard STANcase items which we manufacture to highest quality-specifications with *production-line economy*. Write for descriptive literature.



STAINLESS STEEL
FOOD HANDLING TRUCK No. 18

Ruggedly constructed of 14 gauge, sanitary Stainless Steel.
Inside dimensions: 43½" x 22¼" deep.
Also available in other sizes.
Seamless construction; all corners are generously rounded; maintained clean and sanitary with minimum labor.

STAINLESS STEEL TUB

Constructed entirely of sanitary, Stainless Steel.
Inside dimensions: Diam. Top 19"—Bottom 16"—Depth 13¾".
Inside surfaces highly polished and seamless. Maintained clean and sanitary with minimum labor.

STAINLESS STEEL TABLES

Top, back and sides 14 gauge, sanitary Stainless Steel.
Standard lengths: 8 ft., 10 ft., 12 ft.
Table Tops with cutting board extensions: from 30" to 42".
Table heights adjustable from 32" to 36".

Fully Approved by Health Authorities

THE STANDARD CASING Co., Inc.
121 Spring St. New York 12, N. Y.

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM NEW PACKING SCALE

Another Detecto-Gram Scale for weighing your ingredients *accurately*. New Model #8800 brings to your heavy duty weighing jobs the mechanical accuracy previously found only in small scales. Capacity ¼ ounce to 60 lbs.

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SCALE ENGINEERS IN ALL PRINCIPAL CITIES

A RUGGED PAIR!

CORRECTLY APPLIED..*that's the*

VIKING ROTARY PUMP

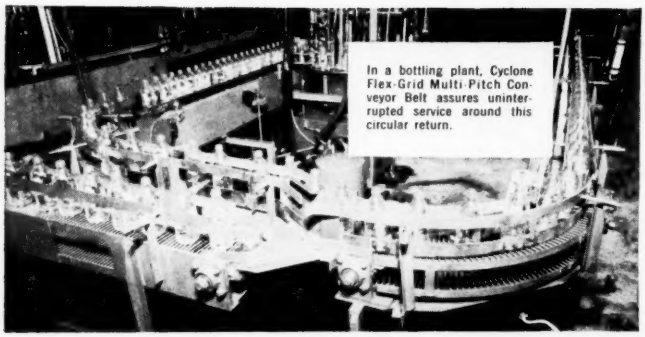
The sturdiness built into the Viking rotary pump is well illustrated in the Viking rotor and idler above. Their wide tooth form and slow operating speed result in efficient operation, with long, dependable service.

This original "gear within a gear" design, most copied of all rotary pump principles, is the key to good pumping. Look to Viking for the correctly engineered pump for your job.

Send us your pumping problem today and ask for bulletin 100E. Both problem and request will be given immediate attention without obligation to you.

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa



In a bottling plant, Cyclone Flex-Grid Multi-Pitch Conveyor Belt assures uninterrupted service around this circular return.

No "bottleneck" here . . .
with a *CYCLONE* Conveyor Belt

FROM Cyclone's 3 belt styles—Flex-Grid, Chain Link, Flat Wire—made in a wide range of metals, alloys, finishes, and mesh and wire sizes—there is a Cyclone Belt to fit the particular operating conditions at your plant.

No matter how difficult your installation may be, our engineers — backed by 25 years' experience—will have the solution. Call our nearest sales office. Offices are in principal cities . . . factories in Mid West and on Pacific Coast. Write for *free* catalog #4.

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
DEPT. H-49, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

J&C ZENITH
CONTINUOUS PULP PRESS

WITH J&C'S NEWEST DEVELOPMENT "Floating Cone"

JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits . . . with the hydraulically operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic operation assures CONSTANT UNIFORM discharge pressure at any pre-determined degree. Fingertip adjustment assures drier cake of uniform consistency.

These engineering triumphs . . . found only in Zenith Press . . . are available to paper pulp, cannery, corn starch, fish reduction, meat packing, glue, citrus waste drying and many other processes.

For further plant uses, for individual problems or for engineering or additional data, write Jackson & Church Company at Saginaw, Michigan.

A PRODUCT OF
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN
"Work well done since '81"

Save on Maintenance Costs — with BUFFALO PlasTex* BELTING

● Because its smooth, plastic surface is easily brushed, washed, or cleaned with live steam, Buffalo PlasTex* Belting *reduces maintenance costs.* Its sturdy wearing quality, too, is your assurance of minimum maintenance requirements, even under conditions of severe service.

For carrying hot or cold, wet or dry substances of any nature month after month at lowest maintenance cost — specify Buffalo PlasTex* Conveyor Belting.

●

Here are some of the outstanding performance features of Buffalo PlasTex* Belting:

Write for full information and FREE SAMPLE!

*PlasTex is the registered trade name for Buffalo Weaving & Belting Company's plastic-covered belting.

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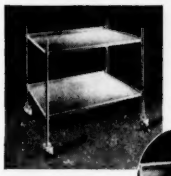
SMART BUYS from

Creamery Package



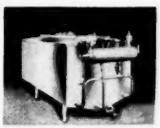
New CP UTILITY WASH-UP TABLE. All-Welded Stainless Steel. Built to take hard use. Dual Tray-Type 25"x 35" Flanged Shelves have drain holes at center and each corner.

CP Boosters and complete refrigeration equipment for foods, beverages, curling rinks and other purposes. 2, 4 and 6 cylinder CP Compressors.

Sanitary Solid Frame Power Conveyors for dairy and food industries. Interchangeable sections and units simplify assembly . . . make changes or additions quick and economical at any time.

CP Stainless Steel Multi-Process Tanks. Ideal for pasteurizing mixing and cooling liquid products. Vapor or Film Heating.

CP Fort Atkinson 40 Qt. Direct Expansion Batch Freezer. Famous for fast freezing, accurate overrun control. Available for use with Freon or Ammonia.



CP Wizard Cold Wall Tank. For direct expansion cooling (with Ammonia or Freon) and holding liquid products. Cold wall sections built integrally.

THE Creamery Package MFG. COMPANY

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

CUT COSTS

REGULATING TEMPERATURE

OF { VATS • TANKS • KETTLES • DRYERS
WATER and OIL HEATERS
JACKET WATER COOLING
DRYING and STORAGE ROOMS
and MANY OTHER USES

Use a Powers Regulator—Maintains a constant temperature. Prevents losses caused by OVER-heating. Saves fuel and labor. Helps to produce a better, more uniform product. Often pays back its cost several times a year and gives 10 to 25 years of service.

SELF OPERATING

EASY TO INSTALL

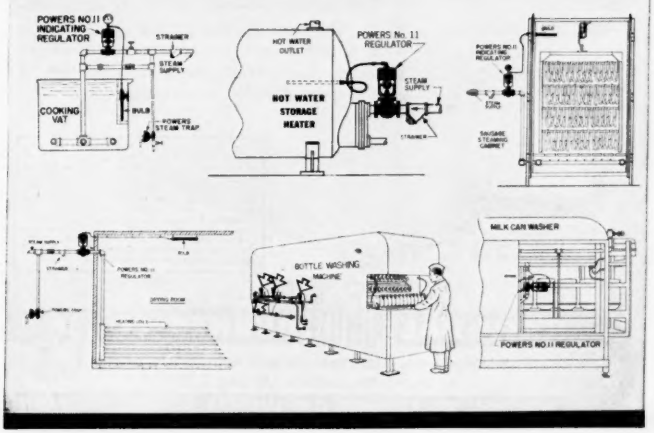
THE POWERS REGULATOR CO.
2720 Greenview Avenue
Chicago 14, Illinois
Offices in 50 Cities • Established 1891

SIMPLE • DEPENDABLE • ECONOMICAL

▶ *Write for Bulletin 329*

11G2

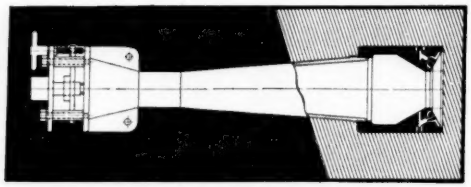
POWERS No. 11 *Self-Operating* REGULATOR



NATIONAL AIROIL FUEL OIL - GAS BURNERS

"AIROCOOL"
GAS BURNER NOZZLES
PATENTED

. . outlast the ordinary nozzle 2 to 5 times



"AIROCOOL" NOZZLE
¼" I.P.S. RAW GAS PILOT
RECESSED REFRACTORY FACING

Recessed facing of refractory insulating plastic protects Nozzle from extreme heat and prolongs nozzle life.

Yes, our "AIROCOOL" Nozzles have the "earned" reputation of outlasting under fire, *two to five times*, the ordinary inspirator gas burner flame retention nozzles. Consequently, they reduce the frequent labor costs, inconvenience, and overhead item of making replacements.

Renewable type recessed gas tips direct the separate igniter flames against the main volume of the mixture to insure stable ignition . . . and allow greater turndown without burnback.

"AIROCOOL" Nozzles are made exclusively by us. They are stocked for pipe thread sizes 4, 5, 6 and 8 inch for various makes of inspirators. Ask for Supplement 3 to Bulletin 55 . . . it gives detailed information.

Section through "AIROCOOL" Nozzle showing igniter port, recessed gas tips and gas pilot.

OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes; **STEAM ATOMIZING OIL BURNERS; MOTOR-DRIVEN ROTARY OIL BURNERS; MECHANICAL PRESSURE ATOMIZING OIL BURNERS; LOW AIR PRESSURE OIL BURNERS; GAS BURNERS; COMBINATION GAS and OIL BURNERS; AUTOMATIC OIL BURNERS,** for small process furnaces and heating plants; **FUEL OIL HEATERS; FUEL OIL PUMPING and HEATING UNITS; FURNACE RELIEF DOORS; AIR INTAKE DOORS; OBSERVATION PORTS; SPECIAL REFRACTORY SHAPES.**

NATIONAL AIROIL BURNER CO., INC.

Main Offices & Factory: 1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PA.
Texas Office: 2512 South Boulevard, Houston 6

INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT

Protect Pumps and Screens! Avoid Downtime! Eliminate Complaints and Lawsuits!

STOP TRAMP IRON with the Powerful Dings MAGNA-TRAP

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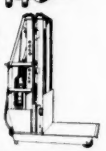

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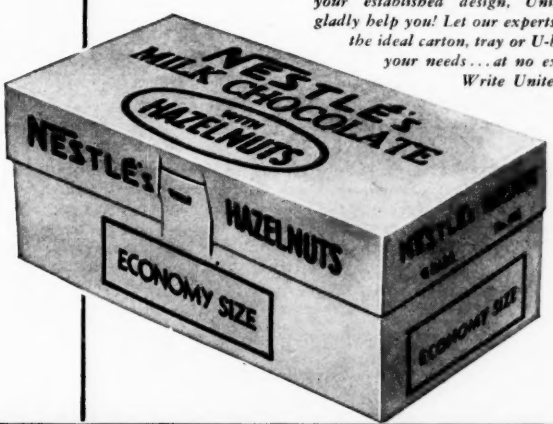

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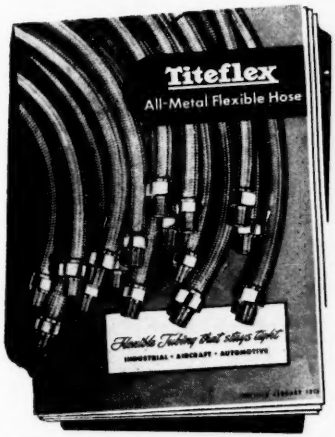

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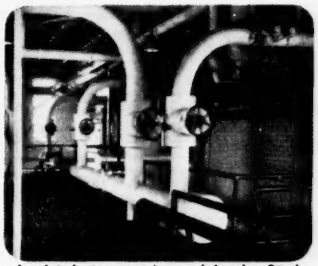

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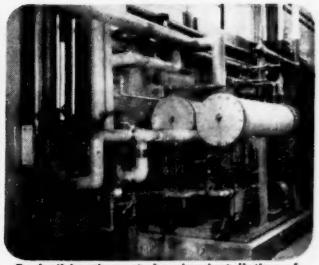

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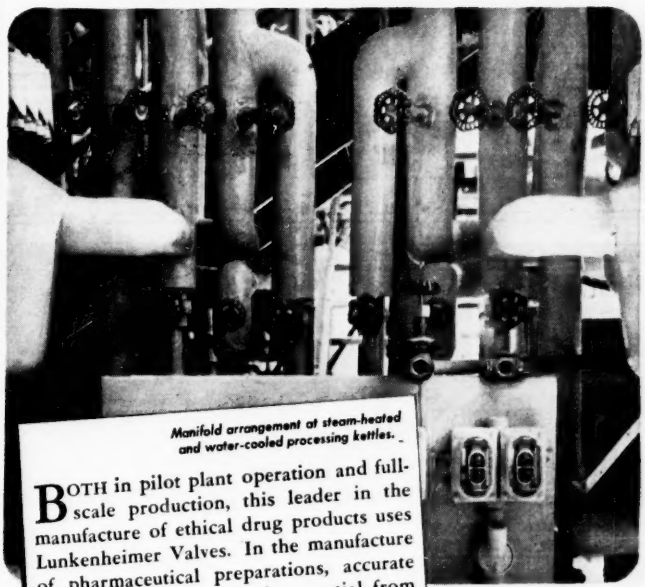

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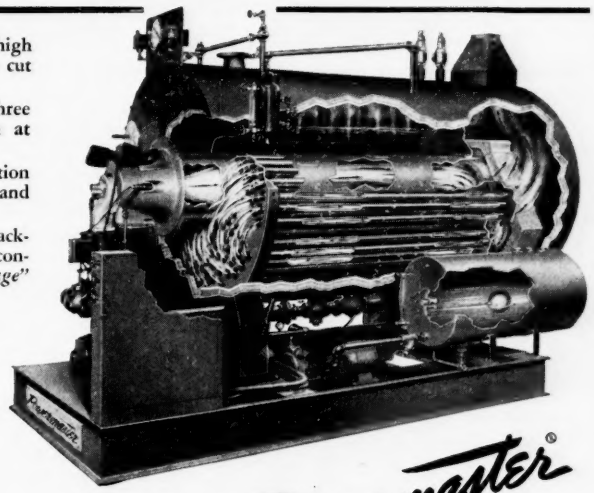

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WANTED: AN Assistant for important liquor manufacturer. Must possess at least elementary knowledge of chemistry and experience in handling men. Also keen sense of smell and taste. Give full details of past experience, age, etc. Salary and future consistent with knowledge, experience and dependability. All information will be kept strictly confidential. P-8059, Food Industries.

QUALITY CONTROL Man wanted—capable younger man for new position to head quality control phase of procurement for large private label buyer of frozen foods. Headquarters Portland or Seattle area. Start immediately. Give full details, background, and salary requirement. Reply P 8242, Food Industries.

●BAHAMAS. FOOD Technologist/Production Manager. Must have experience in Coconut products, canned lobster, pineapple. Must be free immediately. Write stating age, experience, and salary required to the President, Bahama Food Products Ltd., P. O. Box 1411, Nassau, N. P., Bahamas.

WANTED
SALES MANAGER

who has wide contacts.
State age, experience, salary

P-8468, Food Industries
330 West 42nd Street, New York 18, N. Y.

SELLING OPPORTUNITIES OFFERED

WELL-KNOWN British Food distributors with national sales force desire to contact manufacturers of all types of food products in cartons or cans who are interested in selling their goods in the United Kingdom. We prefer to deal with smaller manufacturers producing best quality foodstuffs who have original ideas on marketing and who will be guided by our experience of the British market. Please write full details to RW-6987, Food Industries.

EMPLOYMENT SERVICES

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

FOOD CHEMIST with 25 years experience in direction, development, and quality control in baking, canning, and specialty items. Seeks position as control chemist. PW-8085, Food Industries.

(Continued on page 232)

MANUFACTURER'S REPRESENTATIVE WANTED

To represent old established manufacturer of custom made food machinery, cookers, tanks, etc., on local or country-wide basis.

RW-8280, Food Industries
330 West 42nd St., New York 18, N. Y.

CHEMISTS CHEM. ENGRS.

Dir. of Development, Ph. D.....$12,000
Amines exp. Sales Minded.
Research Chem, Ph.D. .....$ 6,500
Hi-polymer work.
Technical Sales Service. Degree.....$ 5,000
Please write, GLADYS HUNTING.

CASTLE & ASSOCIATES, INC.
220 S. State St. Chicago 4, Ill.

BAKERY SUPPLY CONSULTANT

Available to a limited number of new accounts to teach you the Know-How in making Jams & Jellies, Emulsions, Fudges, Powdered Mixes, etc.

PW-7652, Food Industries,
520 North Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

(Continued from page 231)

SALES EXECUTIVE or General Manager: Top merchandising executive, twenty years experience equipment for national manufacturers. College graduate, ability, assume unlimited responsibility to organize and supervise all details important business. PW 8500, Food Industries.

FLAVOR CHEMIST. Now available. 25 years experience compounding and manufacturing beverage, candy, ice cream, flavors. American Christian. Locate anywhere. Gasteyer 106 E. 16th St., Wilmington, Del.

ADMINISTRATIVE ASSISTANT: Young, Ph.D., 34, interested in learning food administration. Seven years' technical experience in Control, research, production, marketing and development. PW-8077, Food Industries.

FOOD TECHNOLOGIST. Extensive experience production formulation quality control of preserves, jellies, bakers and confections products. Various specialities. Available immediately. PW 8337, Food Industries.

FOOD CHEMIST and Technologist. Masters Degree, 7 years experience in all types of foods. Supervised laboratory. Familiar with all specifications for food products. PW 7579, Food Industries.

SELLING OPPORTUNITIES WANTED

WANTED. EXPERIENCED grocery products sales manager with contacts. State age, experience, salary, etc. SW 8362, Food Industries.

SALESMAN WANTED by reputable flavor manufacturer in New York. Salary and commission basis. State age, experience, names of former employers and expected remuneration. Man with knowledge of the flavor business and a following in the trade preferred. All applications will be held in strict confidence. SW 8403, Food Industries.

BUSINESS OPPORTUNITY

For Sale—Corn Cannery.
Southwestern Ohio, excellent location on State Route, Penn RR Siding, good prospects for '49; selling because of dissolution of partnership. BO 8361, Food Industries.

Salting Station
—Eastern shore of Maryland. 60,000 bu. capacity. Well kept. Tanks alone worth more than asking price. Being sacrificed. BO 8504, Food Industries.

WANTED

ANYTHING within reason that is wanted in the field served by Food Industries can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

INTERNATIONAL FOOD BROKERS

184 North 8th St. Brooklyn 11, N. Y.

Over 30 years in Metropolitan New York and New England. Selling raw materials, institutional and consumers products. Warehouse facilities. Food technologist on staff.

COURSES IN FOOD TECHNOLOGY

MEN OR WOMEN

Fundamentals and laboratory work in Canning, Freezing, Preserving, Science of Nutrition, Food Analysis, Mold Counting, Menu Planning. Night classes. Veterans paid while learning.

MIAMI SCHOOL
FOR FOOD PROCESSING SPECIALISTS
Box 383, Coral Gables 34, Florida

FOOD MFG. BUSINESS

N. Y. CITY

FOR SALE

Established many years with good reputation for products mfgd. Large modern processing plant fully mechanized. All equipment in excellent condition. Inventory valued approx. $75,000 and in good shape. Plant cannot be replaced for $300,000. Excellent loading and shipping facilities. Also interested in merger with responsible party. Principals only.

BO-8393, Food Industries
330 W. 42nd St., New York 18, N. Y.

FOR SALE

Well established FOUNTAIN SYRUP (and other specialties) Mf'g. business in eastern part of U. S. in better quality field with little competition.

Raw materials, stock, equipment, good will and building, a complete and going business.

Owner wishes to retire.
$75,000.00 required.

BO-8476, Food Industries
330 West 42nd Street, New York 18, N. Y.

WANTED

Large engineering firm wishes to acquire several complete food plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence.

Box 1219, 1474 Broadway, N. Y. 18, N. Y.

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WHEN YOU BUY FROM—

MAHONEY FOR MACHINERY

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A NEW HIGH IN PERSONAL SERVICE

"Machinery Shopping" for the Busy Plant Executive. We locate equipment you need or buyer for your surplus. "Finder's Fee" Basis.

PROCESSING - PACKAGING MATERIALS HANDLING

WANTED

2 paddle type washers. Rotex type sifter for shredded coconut. Dryer for coconut (in shreds) 400 lbs. p.h. Vacuum Seamer up to 60 a minute. 10 Scales up to 2 lbs. x ½ ozs. (exact weight type or similar). 4 steam jacketed S.S. Kettles 60 lbs. w.p., 40-80 gals capacity. 40' S.S. Top, packing table with conveyor belt. Quote f.o.b. Miami.

BAHAMA FOOD PRODUCTS LTD.
P. O. Box 1411, Nassau, Bahamas

GET MORE FOR YOUR SURPLUS EQUIPMENT

List it with our bureau
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50,000 Manufacturers Get Our Offerings Regularly. They need such units as:

LABELERS	DICERS	PEELERS
RETORTS	WASHERS	KETTLES
DRYERS	STILLS	MIXERS

or what have you to sell?

For Quicker Action and Better Price Send Full Details and YOUR price to

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USED

ROLLER CONVEYOR

EXCELLENT CONDITION

LOW PRICE

Footage	Width	Roller Diameter	Center to Center
55′	15¾″	2½″	3″
60′	19¾″	2½″	6″
65′	16¼″	2½″	4″
72′	16″	1⅞″	4″
76′	10¼″	2½″	4″
243′	14″	1¾″	4″
338′	10¼″	2½″	4″
405′	23¾″	2½″	6″
426′	15¾″	2½″	4″
427′	16″	2½″	3″

ROCHESTER IRON & METAL COMPANY

P. O. BOX 565 ROCHESTER, N. Y.
MAIN 0464

FOR SALE

LABORATORY TESTING INSTRUMENTS

Suitable for Control Work

1 40-gram Steinlite moisture tester, suitable for testing moisture in dehydrated foods, flour and other powdered food products. Also 1 Saxl Gelometer, for testing gel strength of gelatine, starch, glue, etc. Used very little; excellent condition; exceptional buy.

Mr. S. F. Prager
S. GUMPERT CO., INC.
94-02 104th St. Ozone Park 16, N. Y.

FOR SALE

CLOSED WOODEN TANKS

Totaling 257,000 gals. No. and approximate capacities: 12—1,100 gals.: 11—1,500 gals.: 2—2,000 gals.: 7—3,000 gals.: 3—5,000 gals.: 11—7,000 gals.: 10—8,000 gals.: 3—10,000 gals.: Inside height from 7′ to 8½′; diameters from 6′ to 43′. Redwood and Cypress in good condition.

WINE CORPORATION OF AMERICA
444 W. Grand Avenue, Chicago 10, Ill.

200 Gal. seamless S.S. jacketed steam kettle, agitator. 100 Lbs W.P. Motor and reduction gear mounted. Brand new.

M. MAGGIO CO.
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FOR SALE

1 MARCO 1000 GALLON HOMOGENIZER

Late model, practically new, $2000.00.

ZAUSNER FOODS INC.
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One HORIX ROTARY FILLING MACHINE

Model HBS-18. Fully automatic, worm type feed, speed 55 to 160 glass jars or tin cans per minute. Contact parts made of stainless steel. Operated less than six months. This machine can be inspected at plant

The J. M. SMUCKER CO., Orrville, Ohio
Will sacrifice for quick sale.

FOR SALE
PROCESS EQUIPMENT

1—19½" dia. x 15" deep stainless steel kettle ⅝" thick with bolted-on cover.
1—5' x 5' x 42" JENSEN coil pasteurizer (tinned copper kettle) with agitator coil. 650 gallons capacity.
2—Small Paul O. Abbe laboratory size pebble mills.
2—50 gallon jacketed, agitated open top kettles.
3—65 gallon jacketed DOPP kettles—New, with hinged steel covers.
1—Charlotte stainless steel laboratory Colloid mill with 1 HP A. C. motor.
1—12" x 30" Kent 3 roller water cooled mill.
1—16" x 40" Day 3 roller water cooled mill.
3—12" x 30" Lehman 5 roller water cooled mill.
1—"Ceco" Automatic Carton Sealer Model A-3901-12 with motor drive.
1—Western Bear Cat shredder, size 2A
4—24" x 48" (12 cu. ft.) single ribbon and paddle mixers with A. C. motors.
1—Buffalo double drum dryer 32" D x 90" long.
1—20 gallon (5 blade-paddle type) Stokes tilting type mixer.
1—J. H. Day 6 barrell "Hercules" tilting type mixer with A. C. motors.
1—24" x 24" Sperry C. I. open delivery plate and frame filter presses.
1—7 HP Kane high pressure fire tube gas fired boiler.
1—Norge "FASTEMP" model FH 55 AS room or space heater. For use with #1 or #2 oil.
1—Readco 100 gallon sigma blade heavy duty jacketed tilting type mixer.

Distributors for Crocker-Wheeler electric motors & generators

Also a full line of pumps, tanks of all kinds, kettles, scales, etc.

Ask for latest stock sheet "H"

Emsco Equipment Company
Affiliate of Emil A. Schroth
51 Hyatt Avenue, Newark 5, N. J.
Phone—Mitchell 2-3536

FOR SALE

24"x20" Buflovak Vacuum Drum Dryer
32"x32" Buflovak Double Drum Dryer.
100 and 200 gal. S.S. Mix Tanks, water jkt.
3—200 gal. S.S. Vert. Tanks, insul., agit.
400 gal. S.S. Tank, with S.S. Coil.
40 gal. S.S. Clad, also Alum. Kettles, jkt.
60 & 150 gal. Copper Jkt. Kettles.
100 to 350 gal. Pfaudler Tanks, water jkt., agit.
2000 & 3000 gal. Pfaudler Tanks, agit.
Hobart Mixer, 3 Speed, 2 HP.
75 to 1000 gal. Homogenizers or Viscolizers.
Nos. 10, 25 & 55 Waukesha Nickel Alloy Pumps
Nash "Hytor" Vacuum Pump, 5 H.P. motor.
3' to 6' S.S., also Copper Vacuum Pans.
1½" Tri-Clover S.S. Centrif. Pumps, ¾ H.P.
New 1 gal. Laboratory Autoclaves.

Send us your inquiries.

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FOR SALE

Miller Cellophane Box Wrapper & Sheeter.
75 gal. Copper Steam Jacketed Kettle.
80-qt. Read and Triumph Mixers.
16" and 20" Buffalo Food Choppers
Buffalo Food Grinder with 8½" plates.

SAVAGE BROS. CO.
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QUAKER CITY COLD STORAGE CO.
PHILADELPHIA, PA
3 WAREHOUSES
Proper Temperature for Frozen Foods

FIRST CHECK √ with FIRST for GOOD REBUILT EQUIPMENT Then . . . it's your move . . .

40 Jacketed Kettles S.S., Copper, Steel some agit.; all sizes 25 Vacuum Cookers	Centrifugal Extractors S.S., Monel, Copper DeLaval, Sharples Centrifugal Clarifiers	15 Vacuum Fillers Rotary or Straight 12 Juice Fillers by Haller, Kiefer, etc.	3 S.S. Atmospheric Drum Dryers with all accessories 5'x4' and 5'x10'
6 CRCO Tomato Choppers Pre-Heaters; Heat Exchangers 2 Complete Modern Tomato Processing Lines	Complete Plants for Distilling—Brewery Winery, Rectifying Alcohol Production	Semi and Aut. Labellers by Ermold, World, etc. Burt and Knapp-Kyler Wrap Around Labellers	7 Conveyor Dryers Proctor & Schwartz, Sargent and others S.S. up to 72' long
4 Rietz Stainless Disintegrators — 30 HP 12 Fitzpatrick S.S. Model D Comminutators	14 Cookers-Coolers Exhausters up to 10 Standard Retorts, Vert. or Horizontal	35 Ribbon Type Mixers Day Type, all sizes Auger Type Fillers by Syokes & Smith, etc.	Filler and Elgin Multipiston Fillers from 1 to 11 pistons in stainless, etc.
8 Steam Tube Dryers Louisville-Davenport 3 Davenport Model 3A Dewatering Presses	Sanitary Stainless Homogenizers-Viscolizers Colloid Mills by Eppenbach, Charlotte, etc.	Complete Meat Packing Dog Food Plants Peanut Butter Mayonnaise Salad Dressing	4 Karl Kiefer Visco Fillers 8 New FMC Rotary S.S. Syphon Fillers
Glass Lined Kettles with agit. up to 4400 gal. Gl. Lined Vac. Pans 500 gal. to 2500 gal.	6 Sterling & Urschell Dicing & Slicing Machines Choppers, Grinders, Peelers and Washers	26 Pulpers-Finishers Juice Extractors in Bronze or Stainless FMC, Lamgsenkamp, CRCO	Hammer Mills, Grinders, Crushers, Attrition Mills, Rot. Cutters, Ice & Bone Choppers
4 FMC Hand Pack Fillers in Stainless Steel 5 M. & S. and King Pocket Type Fillers	3 Rotary Vac. Dryers 3' x 5' to 5' x 33' 8 Vac. Shelf Dryers from Lab. to Double Door	Filter Presses by Shriver & Sperry from 6" up to 42" in all metals or wood	Veg. Oil Extraction Macaroni-Spaghetti Citrus Fruit & Juice Chewing Gum Plant

Nobody pays more than F M C for Good Used Equipment

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157 HUDSON ST. WOrth 4-5900 NEW YORK 13, N. Y.

"Consolidated"

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1—Buffalo, Vacuum Shelf, 60"x80", 20 shelves
1—Louisville Steam Tube, 6'x50'
1—Direct Heat Rotary, 3'6"x28'
1—Rotary Vacuum, 5'x33'
1—Buffalo, Double Drum Atmos., 32"x72"
2—Buffalo 32x90 Atmos. Double Drum, 20 HP AC Motors

FILTERS

1—#12 Sweetland 4" centers, iron or copper leaves
1—#10 Sweetland 2" centers, iron or copper leaves
1—#5 Sweetland 2" centers, copper leaves
1—8x12 Oliver Acid Proof Filter
3—36" Sperry 60 plate cast iron, Recessed center feed, open delivery, hydraulic closing

MIXERS

2—Baker Perkins size 17, jacketed, 200 gallon working capacity
1—W&P Size 16, unjacketed, 150 gal. working capacity
8—Baker Perkins size 15, jacketed, 100 gal. working capacity
1—W&P Size 12, jacketed, 20 gallon working capacity
1—1000# Stedman Drum Mixer, M.D.

KETTLES

3—7500 gal. Steel, with copper coils, closed, Agitated, 10' dia. x 12'6" deep, 15' overall height
1—2000 gal. Steel, Jacketed, open top, Agitated, 7' dia. x 7'6" deep
1—1200 gal. Aluminum Kettle, Jacketed, Closed, 5' dia. x 8'6" deep
20—250 gal. Copper, Jacketed, Open top, with stands, 50" dia. x 42" deep
1—700 gal. Steel Jacketed, open top, non-agitated
1—550 gal. Steel Jacketed, open top, non-agitated
1—500 gal. Aluminum, jacketed, closed, Agitated
2—Pfaudler 350 gal. glass lined, jacketed, Agitated
1—200 gal. Steel Jacketed, open top, Agitated
24—150, 80, 60, 40, 20 gal. Aluminum, jacketed

MISCELLANEOUS

2—48" Troy Steel Basket Centrifugals, with V-belt Motor Drive
1—Ball & Jewell #1 Rotary Cutter
1—Eppenbach Size 8 Sanitary vertical Colloid Mill, w/c. s/s, 2 HP Motor
1—#4th Mikro Pulverizer
1—K.K. Piston Visco Filler, #2, 2 oz. to 32 oz.
1—Standard Knapp #429 Auto. Gluer—Compression Unit
1—Stokes & Smith Powder Filler
1—Mojonnier type 6'6" dia. Copper Vacuum Pan
1—Knapp Model 3B, Can Labeler
2—World Rotary Automatic Labelers
1—York 6"x6" Refrig. Unit, 20 HP Motor

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FOR SALE—MODERN PACKAGING EQUIPMENT

PNEUMATIC 60 Per Min. Fully Automatic Cartoning Line, Automatic Feeder, Bottom Sealer, Filler, Top Sealer and Compression Unit.
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PNEUMATIC SCALE CO. Tight wrappers, sheet & roll feed.

PNEUMATIC SCALE CO. Wax Inner Liner.
PNEUMATIC SCALE CO. Automatic Combine Top and Bottom Sealer and Filler. 60 per minute.
PNEUMATIC 4 Scale Net Weight Filler.
PNEUMATIC SCALE TOP TUCKER for Cartons.
STOKES & SMITH Transwraps. Model A-AA-B.
RESINA, Automatic Capper.
CAPEM 4 Head Automatic Capper.
FILLER 2 Spout Stainless Steel Piston Filler.
STOKES & SMITH, Model HG94, Duplex Vacuum Auger Filler.
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TRIANGLE Top and Bottom Carton Sealer with Compression Unit. For large size cartons.
JOHNSON Automatic Feeder and Bottom Sealer. 80 per min.
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PACKOMATIC Cartoning Unit, 8" and 12" sizes. Bottom Sealer, Filler, Top Sealer.
WHIZ PACKERS, with Agitators.
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CHAMPION Wire Staplers.
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WORLD & ERMOLD Spot Labelers.
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NEW JERSEY MACHINE CO. Pony Labelrite Labelers, Model ML, and MX.
CECO 12" Adjustable Top and Bottom Sealers.
MILLER WRAPPER AND SHEETER.
POWDER MIXERS & Sifters, 200 to 1,000 lbs.
PACKAGE MACHINERY F-6 and F-9 Wrappers.
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Single Machines or Entire Plants

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1—Stainless Steel Tank 13,000 gals.—Type 316.
3—Stainless Steel Tanks 1,000 & 2,000 gals.
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1—Glasscote 250 gal. Glass Lined Reactor.
1—Glasscote 300 gal. Glass Lined Vac. Receiver.
1—Stokes 30" x 8' Rotary Vacuum Dryer.
5—Stainless Steel 40" & 48" Sus. Centrifuges.
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1—Ross Stainless Steel Jack. Mixer—10 Gal. Double Arm.
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2—Abbe 6' x 8' Buhrstone Lined Mills.
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10—Horiz. Spiral Mixers 25# to 3500#.
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1—Stokes Rotary Vacuum Dryer—30" x 8', New Stainless Steel Jack. Kettles, Tanks, Agitators, Conveyor. We Buy Your Surplus.

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EVAPORATOR—IN NEW CONDITION

Double effect Mojonnier Tubular Evaporator. Continous operation for producing Condensed Milk—Ice Cream Mix. Never used in manufacturing. Also suitable for condensing other liquids.

Write **HERSHEY CREAMERY CO.,**
Box 121 Harrisburg, Pennsylvania

FOR SALE

One 500 gallon glass lined tank, side agitator	$50
One Stainless steel tank with turbo mixer, 135 gallon, jacket	500
Three stainless steel tanks, 100 gallon capacity, with turbo mixer, no jacket	150
One stainless steel tank, 300 gallon capacity, turbo mixer, no jacket	250
One progressive engineering company four spout filler, stainless steel contact parts	600
One consolidated packaging machine, four head type B-1-F Capper change parts for ½ pt., pt., qt. mayonnaise jars	1000
Two Schutz O'Neill Spice Grinders, each	100

Offered where is, as is, subject prior sale. Can be seen by appointment, Philadelphia.

Contact:

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AMERICAN STORES COMPANY
424 North 19th Street Philadelphia, 30, Pennsylvania

FOR SALE

1 Monitor tomato washer
1 New peach washer, scalder, slicer and enclosed type tubular pasteurizer, all F.M. make
2 Fay & Scott strawberry cappers in excellent condition
1 Selectro 18 x 60 vibrating screen.

Also the following motors:

1 Westinghouse 220-V. 20 HP
1 GE 220-V 15 HP
1 220-V 30 HP
1 West. 200-V 20 HP, double shaft
1 West. auto starter 220-V 20/30 HP
1 250-V 400 Amp. 3-pole Trumbull, Type "A" switch, 3 fuses.

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STERILIZER

One Walker-Wallace Tomato Juice Sterilizer with 54 Stainless Steel Grooved Plates. This is complete with circulating pump and all controls. Used one season.

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Rebuilt Processing Equipment

IMMEDIATE DELIVERY — GREAT SAVINGS

UNION Rebuilt Machinery Established 1912

Mikro 24", 1-SH and Bantam Pulverizers, Jay Bee Mills—U-1, 3AT, Schutz-O'Neill, Fitzpatrick Comminuters.

Baker Perkins & Readco Heavy Duty 100-150 Gallon Double Arm Jacketed Mixers with Sigma or Fish Tail Blades.

Stokes, Day, New Era, Hottman Mixers, 2 to 3500 gal. with and without Jackets. Single and Double Arm Agitators.

Day & Robinson 100, 400, 600, and 1000, 2400 & 4000 lbs. Dry Powder Mixers & Sifters.

Gayco 8 ft. Air Separator, Robinson #31 and Schutz-O'Neill #3 Sifters.

Ross, Kent and National Equipment, Steel and Granite, Three-Roll Mills.

Huhn, Wolfe and Ellis Steam and Gas Fired Dryers.

Vacuum Pans with and without Heavy Duty Agitators, 20", 3', 4', 5' and 6'.

Lee Metal 125, 200, 250 gallons Stainless Steel Jacketed Kettles, 50 gallon Tilting type with Agitator.

Horix, MRM, Mojonnier and Elgin Stainless Steel Rotary Filler: Kiefer Single and Bagby Twin Piston Fillers with Bottom Feed.

Pony Labelrite, Ermold and World Semi-Automatic, and Fully Automatic Rotary and Straightway Labelers.

Burt Automatic Wraparound Labeler.

Pneumatic Scale and Resina Automatic Cappers.

Stokes and Colton Late Style Rotary Tablet Machines: Stokes Model T.

Standard Knapp #429 and J. L. Ferguson Carton Sealers.

Stokes and Smith G1, and Duplex Automatic Auger Powder Fillers.

Triangle U1 Semi-Automatic Auger Powder Filler.

Sperry, Shriver, Sweetland, Vallez and Johnson Filter Presses, all sizes.

Package Machinery FA, FAQ, FA2, Hayssen and Miller Automatic Wrappers.

Urschel #6 and Anderson #3 Dicers.

Pneumatic Automatic Carton Lining, Filling and Sealing Machine.

Pneumatic Scale, 4 Head Automatic Net Weigher.

Union Special Bag Sewing Machine for tape bound closure of Multi Wall Bags.

PLANTS AVAILABLE

Peanut Butter—Macaroni

Anderson Expeller

MANY OTHER ITEMS OF INTEREST IN STOCK—FULLY GUARANTEED

Write, Phone, Wire Collect For Details and Prices on Your Requirements

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318-322 LAFAYETTE ST., NEW YORK 12, N.Y.

PREMIUM PRICES PAID FOR YOUR SURPLUS EQUIPMENT

EQUIPMENT

FOR FOOD AND PROCESS INDUSTRIES

1—Tolhurst center slung rubber lined extractor, 30" basket.
1—Tolhurst rubber lined extractor, 20" basket.
2—S.S. Jacketed Kettle, 300 and 220 gallons.
2—Mikro Pulverizers, #1SH and #2TH.
1—Fitzpatrick Comminuting Machine, Model D.
6—Louisville Rotary Steam Tube Dryers, 6' x 50'.
2—Shriver Plate & Frame Filter Presses, 42" x 42", with hydraulic closing device.
1—Day Mogal Type Mixer, Size 5, Type MDB.

R. GELB & SONS, INC.
Est. 1886 UNionville 2-4900 UNION, N. J.

Attention Chemists

FOR SALE

1 Coleman, Model 3-D-pH Electrometer, Serial #4072. Purchased new from Wilkins-Anderson Co. and used very little.

WILSON CANNING COMPANY
WILSON, N. Y.

---

100 H.P. Horizontal LEFFEL BOILER

125 lbs W.P. in original crating
Brand new.

M. MAGGIO CO.
918 S. 9th St. Phila. #47, Pa.

FOR SALE

1—B.P. 15 gal. H.D. double arm jktd. mixer, vacuum
1—W&P 100 gal. H.D. double arm jktd. mixer
2—Horiz. Retorts 33"W x 28"H x 15'6"L
1—Copper Vac. Pan, 6' dia. jktd. coils, condenser
2—Copper Vac. Stills, 100 gal. jktd. agit.
1—Aluminum Still, 175 gal. coils
1—Aluminum Autoclave, 100 gal. jktd. agit.
1—Iron Autoclave, 130 gal. jktd.
1—Rotary Steam Tube Dryer, 5'6" x 30'
1—J. H. Day #11½D Dough Mixer
11—Stainless Kettles—100# jkt.—50 to 500 gal.
15—Stainless Clad Kettles—40# jkt—30 to 80 gal.
1—Aluminum jktd kettle—40 gal.
1—Aluminum Kettle, 1000 gal., jktd. agit.
6—Copper Jktd. Kettles—30 to 120 gal.
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12—Jktd Glass Lined Tanks, 1000, 1450, 1800 gal.
20—Wood Tanks, 3600 to 13,000 gal.
45—Stainless Steel Tanks, 30 to 500 gal.
10—Triclover Stainless Sanitary Pumps,—NEW
6—Duriron Pumps, 90 GPM @ 45'.
1—Stainless 4-piston filler
6—Ayars 8 pocket model "C" Pea & Bean Fillers
1—Packaging line for cartons—includes former, filler, gluers, etc.
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1—World Semi Auto. Vac. type Labeler
8—World & Ermold Semi Auto Labelers
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1—Standard Knapp Case Gluer T & B
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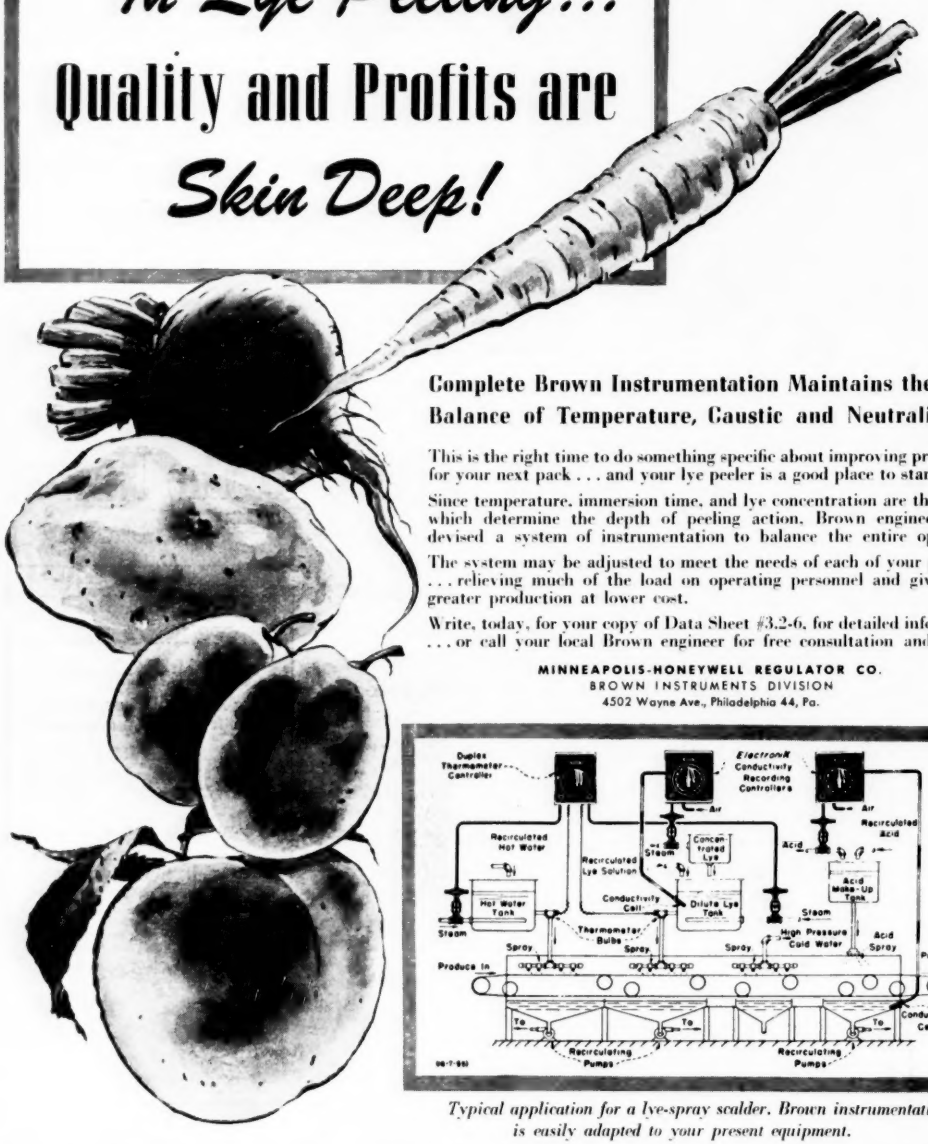

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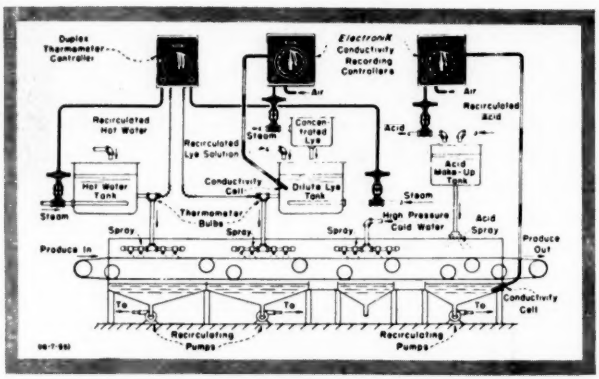

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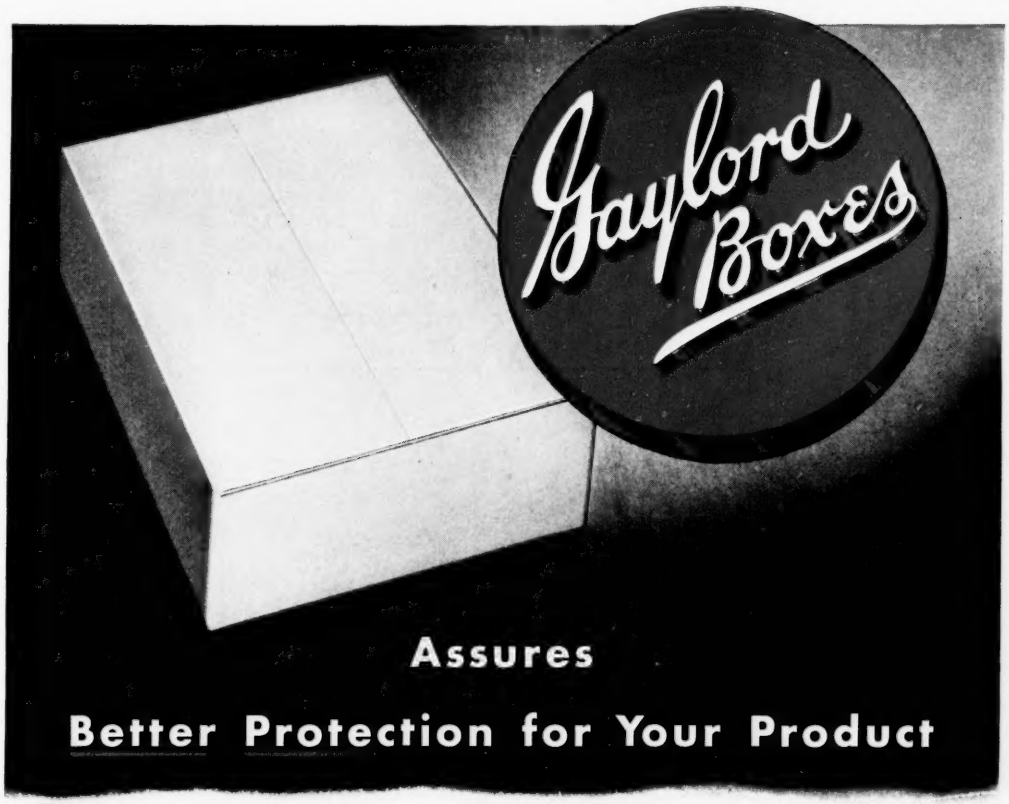

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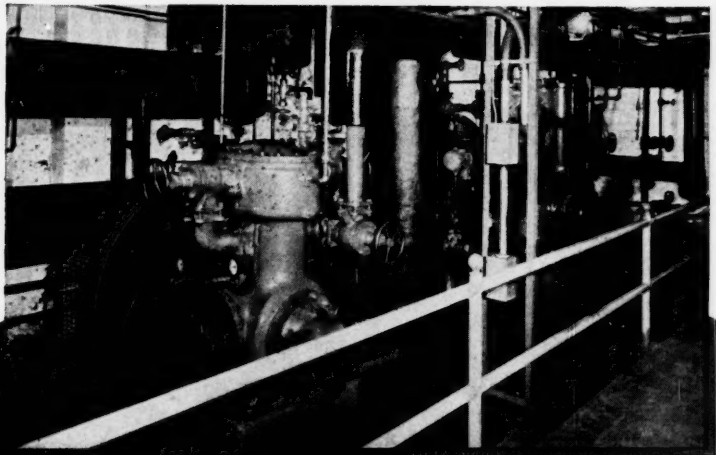

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